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THE PRESENT STATUS OF INGUINAL HERNIA AND ITS REPAIR*

STANLEY R. MAXEINER, M.D., F.A.C.S.
Minneapolis

THE draft boards of the United States revealed that 2.08 per cent of two and one-half million men between the ages of 21 and 31 examined for the army were unfit for military duty because of hernia. Estimating from these figures as a basis Andrews¹ believes we are safe to conclude that there are from 4 to 6 million people in this country who have hernia. Men with hernia are considered unfit for military service and at the present time large industrial corporations who examine their employees are rendering it more and more difficult for those who have hernia to obtain employment. With the advent of industrial compensation, hernia has reached a point of considerable importance legally and economically. In fact it must be of importance to both employer and insurance carrier if the statement of experts that the disability of hernia is 25 per cent is assumed to be correct.

The present status of the compensability of hernia is still unsettled, as is likewise medical opinion. Henderson² states that the sudden appearance of a hernia always means a pre-formed sac, and Russel^{3a} maintains that an acquired hernia does not exist. Sellenings^{3b} says that traumatic hernia is a surgical curiosity. Mock⁴ states: "The decisions of established medicine date back to the pre-compensation days and were based on the testimony of expert authority made in the courts of England especially, and later in our own courts, to the effect that a traumatic hernia could only occur from a direct violence resulting in a definite tearing or rupture of the abdominal wall. All other hernias were claimed to be due to congenital defects, pre-formed sacs, and to be similar to all other diseases which might occur coincidental with occupation but not related to it." MacCready^{5a} believes that an ac-

quired hernia is never due to an accident or single increase of intra-abdominal pressure. Graser,^{5b} one of the highest German authorities, states that hernia, complete in all its parts, can never arise at the moment of accident or by a single increase in intra-abdominal tension be it ever so great. Coley,⁶ in his work at the hospital for ruptured and crippled, states that in a period of thirty-one years he has not seen one hernia caused by a single injury and he feels that an injury of such severity would likely result in death. However, the French speak of the Hernia of Effort, which includes those cases in which the hernia appears during heavy lifting, slipping, falling, coughing, etc.

A very strong argument advanced by Hopkins⁷ for the physical examination of employees is based on the fact that railway engineers, firemen, conductors, brakemen, etc., who are required to pass preliminary physical examinations constitute 1 per cent of the so-called traumatic hernias, while the men who do not pass preliminary examinations, composed largely of foreigners, constitute the other 99 per cent. It has been suggested that those found by preliminary examination to have hernias, or enlarged rings, sign releases, while those who pass normal examinations might be compensated for hernias which develop during occupation.

Inguinal hernia is often given a special classification because of the character of its contents, but the old classification with reference to the deep epigastric artery seems to be generally accepted as standard throughout the literature, both local and foreign. However, the writer is certain that many hernias are classified as direct when they are atypical, although they are not mesial to the deep epigastric vessels. Besides the indirect or oblique and the direct, there exists the pantaloons or saddlebag hernia, which is a

*Presented before the Minneapolis Surgical Society, Dec. 1, 1927.

double hernia on both sides of the epigastric vessels and often is unrecognized at the time of the operation so that only one hernia is cured and the other manifests itself later as a recurrence. Watson⁸ states that direct hernias constitute from 5 to 7 per cent of all inguinal hernias; Coley and Downs⁹ about 7 per cent.

lives which could have been prevented. Murphy, in his year book, referred to Wolfler's statistics as emphasizing the mortality of procrastination. All authors seem to agree that local anesthesia is preferable in the presence of strangulation.

Among the causes of recurrence all authors agree that incomplete removal of the sac is per-



Fig. 1. The external oblique fascia has been exposed and split well above the external ring. A forceps passed into this rent and out the external ring is especially helpful in a case of strangulated hernia. Wire spring retractors of Farr insure constant retraction and give the assistant free hands.

MacCready's cases were approximately the same. Erdman reported nearly 33 per cent of his series to be direct hernias, which Coley¹⁰ believes is much higher than in any other statistics. The combined direct and indirect hernia is rare but must be searched for at every hernia operation. Erdman reported inguinal hernia operations were done on both sides on 1 in 4 cases and that follow-up showed that 37.4 per cent eventually developed bilateral hernia.

Strangulation is the most serious clinical complication of hernia and warns one of the danger of palliative management. In Wolfler's Clinic,¹¹ the mortality was 19.7 per cent with a loss of 148



Fig. 2. The external oblique has been separated mesially over the rectus muscle. The sac has been removed and the neck dropped back, the cremaster has been separated from the cord, doubly ligated and divided. This step insures a smaller cord to transplant and is done routinely. Interrupted chromic sutures pass through the white fibers mesial to the red muscle and through Poupart's ligament approximating white fibrous tissues under the cord. The transversalis is first sutured to Poupart's ligament in those cases in which it is adequate.

haps the most common. This leaves a pouch, or dimple, into which the abdominal contents crowd with the formation of a new sac and hernia. Watson places secondly faulty methods of closure, such as an improperly chosen operative technic, neglect to make the cord as small as possible, failure to close the internal ring tightly about the cord, failure to properly unite the layers of tissue, and failure of the operation to wholly correct the original defect. Failure to recognize a second sac in the pantaloony type, hemorrhage, and infection, are preventable causes, and when suppuration occurs the percentage of cures falls off rapidly. Taylor¹² reports a recurrence of 25 per cent where infection followed operation for oblique hernia and

50 per cent when infection followed operation for direct hernia, while Erdman¹³ reports only 10.9 per cent recurrences in all their infected cases. Injury to blood and nerve supply and strangulation of tissue by sutures constitute other preventable causes, but poor physical condition, such as poor musculature, obesity and general

his cases which returned for re-examination. His records show that 47.9 per cent of all recurrences were noted within six months after operation, 73.9 per cent within 12 months and 98.6 per cent within two years. He believes that if a recurrence does not take place within two years after operation we may consider the case



Fig. 3. After suture of the white fibers of internal oblique to Poupart's the cord is retracted mesially and the external flap of external oblique is turned over this line of suture and under the cord. This will give a wide fibrous approximation and a nearly transverse direction to the upper portion of the new canal.



Fig. 4. The suture of the external leaf of external oblique continuous with Poupart's ligament has doubly reinforced the original hernial defect. This method gives additional security to the region directly above the pubes where direct herniae often recur. The transverse upper part of the new canal has been established.

debility, whether due to general disease or to senility, are important causes which the surgeon cannot prevent. McGlannon¹⁴ in a recent work says that the causes of failure to cure hernia fall into two groups, those due to anatomical peculiarity of the patient, and those due to accidents and omissions in the course of the operation or to interference with the process of healing.

LaRoque¹⁵ summarized thus: "Recurrent hernia represents the incompletely removed original hernia, or the development of an incisional rupture following the breakage of sutures or tissues by coughing, vomiting, or wound infection."

The work of Erdman¹⁶ is especially noteworthy because of the extreme care used in repeated examinations and the large percentage of

cured. Reports of recurrences in hernia, according to Watson, vary from 1 to 10 per cent. In a review of reported series of cases the writer has selected the following which are grouped as to type of hernia.

RECURRENCES IN INGUINAL HERNIA IN GENERAL

Coley and Hoguet¹⁷ in 3,725 cases treated by the Bassini operation had .38 per cent recurrences while in 792 operations treated by the Ferguson method 1.3 per cent recurred. Schwartz¹⁸ in 207 cases treated by the Bassini method had 5.3 per cent recurrences. Ricketts¹⁹ collected from the literature 6,027 operations for inguinal hernia by thirty-four surgeons with 5.58 per cent recurrences.

Recurrences in Indirect Hernia.—Lameris²⁰ in 511 cases treated by the Bassini method had recurrences in 3.9 per cent. Erdman²¹ treated 532 cases by the Bassini method with 3.2 per cent recurrences but in 112 cases in which the cord was not transplanted only 2.67 per cent recurred. Erdman reports 665 oblique hernia operations

Erdman reports that in 313 direct hernias with all methods used by them 16.61 per cent recurred. Taylor reports 47 operations for direct hernias with 29.7 recurrences. Coley in 280 direct hernias in the male adult had 16 per cent recurrences.

Recurrences in Pantaloon or Saddlebag Her-

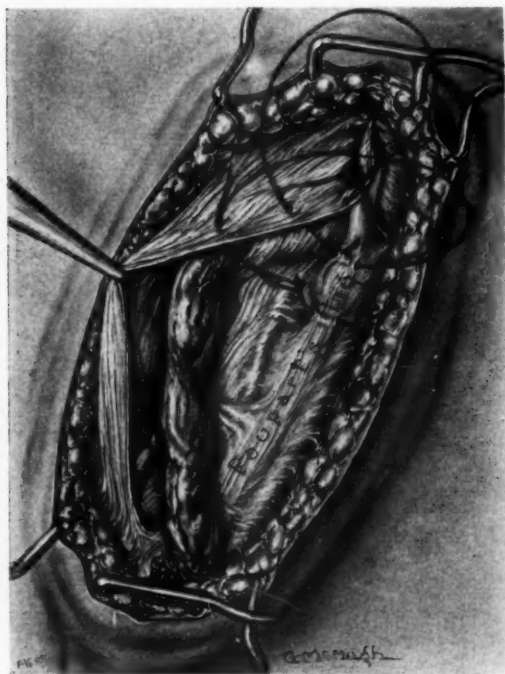


Fig. 5. The mesial flap of external oblique is being sutured over the cord which establishes the balance of the new canal and the external ring. Poupart's ligament underlies the external flap to which the mesial edge is attached.

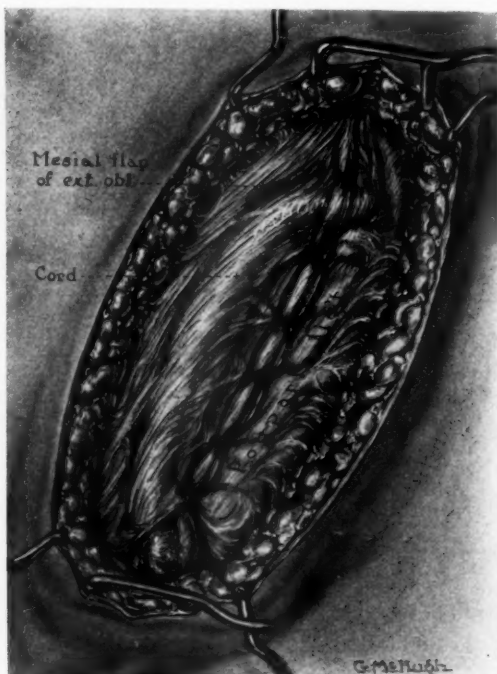


Fig. 6. Fascial closure is now complete, effected by three layers of tissue and three lines of sutures. The course of the new canal is visualized under the mesial flap of external oblique.

with 3 per cent recurrences by all methods used by them. Taylor in 356 oblique hernias had 8.4 per cent recurrences. Coley in 332 oblique hernias had 8.7 per cent recur.

Recurrences in Direct Hernia.—Watson states that in the hands of experienced surgeons recurrences run from 10 to 20 per cent in direct hernias, while many surgeons experience recurrences as high as 25 to 50 per cent in similar cases. Lameris in 102 direct hernias treated by the Bassini method had 28.4 per cent recurrences. L. Davis²² experienced 15 per cent recurrences. Erdman in 185 direct hernias treated by the Bassini method had 15.67 per cent recurrences but when the cord was not transplanted in 25 cases there were 28 per cent of recurrences.

nia.—Erdman²³ had 14 per cent recurrences and Coley had 12.5 per cent recurrences in twenty-four cases. Murphy reported a gradually increasing recurrence of from 1 per cent under 1 year to 9 per cent in patients over 60. The age at which the largest number of hernias occur is during young adult life when activity is the greatest, in whom operative recurrences vary from 1 to 10 per cent. Erdman had 10 per cent recurrences in indirect hernias and 42.8 per cent in direct hernias in patients over 60 years of age. The great divergence of recurrence statistics is partly due to the fact that many are based on follow-up letters and not on follow-up examinations as are Erdman's. The opinion of Seelig is that the low percentages are too low and that the

high percentages are more nearly accurate and that in the hands of inexperienced surgeons, often beginners, they are much worse.

Coley followed up 263 operations for indirect hernia in male children and found no recurrences. He believes that there should be practically none in children with or without cord transplantation if the sac is completely removed. Herzfeld performed 1,000 consecutive operations for inguinal hernia in children with but one recurrence (0.1 per cent); 266 were over and 734 were under one year of age.

There are comparatively few spontaneous cures of hernia even in childhood and often when the hernia does disappear it will return again in later life under the stress of heavy lifting, coughing, etc. The usual tendency displayed is for the hernial sac to increase in size, constantly stretching out the abdominal wall, weakening the tissues and reducing the chances for ultimate successful surgical repair. In many instances the hernia continues to become progressively larger in the presence of a truss, which by its pressure causes an attenuation of the abdominal fascia. In other instances the truss fails to retain the viscera within the abdominal cavity. Andrews²⁶ states that the temporary prescribing of a truss is objectionable, as postponing operation only reduces the chance for a surgical cure. The patient should decide at once whether he will have an operation or wear a truss permanently. He also states that when truss fitting is turned over to a layman without proper medical supervision little success can be looked for. Sixty-two per cent of trussed patients questioned by him had never been told to apply the truss in the reclining position. Santon²⁷ found that in more than 96,000 patients treated by truss only 4.5 per cent were cured.

In uncomplicated operated cases Coley²⁴ experienced a mortality of .37 per cent. Watson collected 8,000 herniotomies with .37 per cent mortality while Herzfeld²⁵ in her series of 1,000 cases had one death from status lymphaticus in which the patient died on the operating table—a mortality of 0.1 per cent. Edmund Andrews states that the danger of herniotomy in children is less than tonsillectomy, an operation often performed with the slenderest indications.

Seelig²⁸ places the principles of hernia repair under three headings:

1. High ligation of the sac.
2. Adequate reinforcement of the defective abdominal wall.
3. Primary wound healing.

High ligation of the sac implies a wide liberation of the peritoneum about its neck when it may be closed within by a peritoneal suture or by transfixing or by ligating the base. LaRoque²⁹ makes a muscle splitting incision into the abdominal cavity 1 inch above the neck and closes the sac from within. Regardless of how the closure is accomplished, all authorities agree that the sac must be entirely removed. Adequate reinforcement of the defective abdominal wall is far from a standardized procedure. In children the cord may or may not be transplanted, but in adults the majority of statistics favor the Bassini operation in which the cord is transplanted. The numerous modifications of the Bassini technic with the idea of fewer failures leads one to conclude that there is no specific operation and that



Fig. 7. Showing local anesthesia infiltration and blocking after the technic of Farr. Photograph of illustration from text.

all are followed by failures. The greatest recent step forward comes from the research of Seelig in which he shows that facia-to-fascia closure is the strongest.

The greatest number of failures is the repair of recurrent hernias and here the use of buried foreign material fails because of the high percentage of infection. On the other hand the use of living fascial sutures after the method of McArthur³⁰ or Gallie,³¹ although scarcely suited for the simple cases, is of greatest value in the repair of recurrent cases. Gallie has had no recurrences in 100 cases followed for two years. McArthur cuts the fascia strips from the

edge of the external oblique and Gallie cuts them from the fascia lata with which he weaves the defect. These living sutures unite with the fascia and survive as the original fascial strips.

Six years ago I served with Dr. A. T. Mann, at that time Chief of the Surgical Service of the Veterans' Hospital at Minneapolis, who attempted to standardize certain principles in the repair of inguinal hernia in that hospital. These principles which he advocated serve as the basis of the technic here described with certain personal modifications in an effort to secure a greater white fibrous tissue approximation as advocated by Seelig. The method has been applied by us in a large number (more than 500) with great personal satisfaction. I have made an earnest personal effort to follow several hundred cases but our Government patients are scattered over more than six states so that personal examination is out of the question. Many ex-service men seemed to fear impairment of compensation rating and a questionnaire, although answered, did not afford information for reliable conclusions.

All operations by the writer, and nearly all by the other surgeons on the staff, were performed under local anesthesia.

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DR. A. T. MANN: This paper on Hernia has been very interesting and it has been well presented. This operation is one I devised some years ago in a search to improve the Bassini operation and its well known modifications. It was published about 1912. There are a few practical things I wish to touch upon.

(1) The cremaster is inserted between the conjoined tendon and Poupart's ligament from the spine of the pubis back along the pectineal line. If this is thoroughly cleaned away here, the conjoined tendon will come into a broad, direct contact with Poupart's and Gimbrernat's ligaments when sutured.

(2) The sac should be ligated in such a way that the puckered stump will be drawn away from the cord as it emerges through the internal ring. Any pouch in it will not then be pushing outward into the ring, but against the firm belly of the muscle, where it can do little harm.

(3) The cremaster muscle should be separated from the cord. It can then be tucked under the conjoined tendon and its muscle add its strength to the repair line. Sometimes one will suture it into place and some-

times it may lie so well in place that sutures are not needed.

(4) The cord should be cleaned of adventitious tissue and made small in that portion which is to lie in the internal ring. The rest of the cord does not matter so much. I do not believe that the veins of the cord should be tied and removed, as a rule, as there is a marked tendency to thrombosis in the remaining vessels. This is one cause of atrophy of the testicle.

(5) The internal ring: Before the first line of sutures are placed it is excellent practice to insert a finger against the outer border of the internal ring and root around just enough to stretch the loose tissue, which is practically always there, until the finger comes up against the firm belly of the muscle, and so insure a firm upper border to the ring.

(6) Great care should be used in placing the first row of sutures so that the ring will be snug enough about the cord, but not sufficient to choke it. The main line of sutures should be smooth, but not tight enough to cut off the circulation in the tissues within their grasp. We feel that tight sutures are one cause of recurrences and a tight ring a cause of atrophy of the testicles.

(7) The lower flap of the aponeurosis of the external oblique is already grown fast to Poupart's ligament. This insures strength added to the first line of repair when it is drawn under the cord and fastened well over onto the recus sheath and on the upper surface of the internal oblique and the conjoined tendon beneath the upper flap of the aponeurosis. The scar tissue holding it will be from half an inch to three-quarters of an inch wide and the suture line well away from Poupart's. The carefully placed suture below the internal ring strengthens the ring. This flap, then, strengthens the internal ring, the external ring and the entire first line of repair with a firm tissue sutured at a good distance above Poupart's and the first line stitches.

We feel that this modification of the Bassini operation offers a method which promises better results than the straight Bassini operation or its usual modifications.

DR. R. C. WEBB: This has been a presentation of a very thorough and apparently satisfactory method of repairing a hernia. I should like to mention further the work of Dr. Erdman, to whose statistics Dr. Maxeiner has referred. Dr. Erdman's work was done at the New York Hospital and part of it was during the period in

which I served as House Surgeon. In 1913 their very thorough follow-up system was established and a subsequent report is obtained upon about ninety-five per cent of the cases. The members of the House Staff and the Attending Staff systematically worked at this follow-up work and as a result the statements concerning ultimate results are based upon actual knowledge rather than upon possibly prejudiced opinion.

Doctor Maxeiner called attention to the fact that there were fewer recurrences with the Ferguson operation than with the Bassini in Erdman's statistics. This may possibly be explained by the fact that the Ferguson operation was used in the younger patients.

In the presentation tonight the tape method was used in holding the cord away from the field. In this connection it is well known that pulmonary infarcts are most common after strangulated hernias where there has been a stasis and possibly thrombosis in the veins of the cord. For many years I have made a practice of holding the cord away from the field by holding it back with two Allis clamps passed under it and fastened to the lower edge of Poupart's ligament and then laid on the thigh. In this manner we avoid some of the manipulation attendant upon the use of a gauze tape under this mass of delicate veins.

DR. KENNETH BULKLEY: Dr. Maxeiner's paper on inguinal hernia is of importance and is opportune, not only because of the operative technic which he advocates and on which he is to be congratulated, but because it brings to our attention the subject of hernias. Dr. Maxeiner has cited a long list of authorities, all of them emphasizing the fact that an inguinal hernia is practically never produced by a single act of violence unless that act be in the form of a piercing or penetrating injury in the region of the canal. As you all know, these cases of inguinal hernia are constantly coming before our Industrial Boards and Commissions for decision as to whether the employer shall or shall not be responsible for them. Personally I see rather a large number of these cases and it is a constant surprise to me to hear physicians testify under oath that in their opinion the hernia which the individual patient has, has been caused by the accident under discussion. Fortunately it is not our function to say whether an employer is or is not liable, but it does seem to me that it is our function to testify as to what the probable cause of the hernia is and I think that none of you, after hearing this paper of Dr. Maxeiner's, can say otherwise than that a given hernia is not, in a majority of instances, produced by any single accident.

INTRA-THORACIC GOITER*

NEIL JOHN MACLEAN, M.D.
Winnipeg, Manitoba

MY reasons for selecting intra-thoracic goiter as a subject are:

1. Cases have come under my observation in which the condition had been previously overlooked. This has occurred, not only in the general and preoperative diagnosis but also during the operation of thyroidectomy.

2. The removal of an intra-thoracic goiter, which at first sight may appear to be a very formidable undertaking, is usually simple and relatively safe.

3. The relief obtained from the removal of this distressing condition is so marked that no patient should be denied the advantage of surgical treatment.

Seven patients with intra-thoracic goiter have come under my observation in a series of 500 goiter operations. Of these, five were operated upon. One was seen in consultation and operation advised. One was over 70 years of age and had been treated for asthma and angina pectoris. The series included one so-called "plunging goiter" and sixteen substernal goiters. There were several others where the lower pole was below the level of the clavicle, but these were not considered worthy of special classification.

In the seven cases which form the basis of this study the tumors were entirely within the thoracic cavity and attached to the lower pole of the thyroid gland by a narrow pedicle.

Five were in females and two in males. Three were definitely toxic with basal metabolic rates of plus 45, plus 55, and plus 70 per cent. In only two of the five was a preoperative diagnosis made by *x*-ray plates.

When a patient, the subject of an adenomatous goiter, has distress in breathing; a sensation of pressure in the thorax, and dilatation of the superficial veins over the front of the chest, intra-thoracic goiter should be at once suspected. If the enlarged thyroid does not move freely with the larynx and trachea in the neck when the patient swallows, our suspicions should be further aroused, and if the index finger cannot be placed

between the lower pole of either lobe and the upper border of the sternum and clavicle, a radiogram of the chest should be taken. But some or all of the above mentioned symptoms may be absent even with a fairly large intra-thoracic goiter and it is then that the condition is so apt to be overlooked.

Ordinary means of physical examination such as percussion and auscultation do not give satisfactory indication as to the presence or absence of intra-thoracic goiter. At best, indefinite dullness may be elicited on percussion, depending on the size of the tumor.

The diagnosis of intra-thoracic goiter resolves itself, therefore, into the proper interpretation of well taken stereoscopic *x*-ray plates.

When should *x*-ray plates be ordered? Some have said that in all cases of adenomatous goiter of long standing *x*-ray plates should be taken to exclude the possibility of extension downwards into the mediastinum. Only by making this a routine could one be sure that such a condition would not be overlooked. But when we consider the comparative rarity of intra-thoracic goiter, this would seem a rather unnecessary waste of plates and also an extra expense to the patient which should if possible be avoided.

We ask for *x*-ray plates under the following circumstances:

1. When a patient has an adenomatous goiter where the pressure symptoms such as dyspnea (obviously not of cardiac origin) are out of proportion to the size of the tumor in the neck.

2. When there is a small nodular goiter and a tugging can be felt at either pole when the patient swallows.

3. When toxic symptoms are present with elevated basal metabolism and no evidence of enlargement of the thyroid gland, especially in the absence of exophthalmos.

4. When there are dilated veins over the chest wall, indicating interference with the venous return.

5. When there is an unproductive cough, and ordinary examination of the throat and chest are

*Presented before the Minneapolis Surgical Society, Sept 29, 1927.

negative, especially when this is associated with adenomas of the thyroid.

6. All cases of asthma and angina pectoris associated with an adenomatous goiter.

Having ordered x -ray plates, we find that either the superior mediastinum is a negative, which settles the issue, or there is a shadow which is probably one of the following: (1) Intra-thoracic goiter; (2) aneurysm; (3) dermoid cyst; (4) malignant tumor; (5) tuberculosis in the mediastinal glands or cold abscess secondary to caries of the upper thoracic spine; (6) Hodgkin's disease or lymphatic leukemia; (7) persistent or enlarged thymus; (8) lipoma.

Norris and Landis¹ state that "mediastinal tumors of the benign types are of pathological interest only and during life are not to be distinguished one from the other, with the exception of dermoid cysts." Anyone who has had the responsibility of a consultation on a case of mediastinal tumor would not agree that these tumors are of interest only to the pathologist.

The following findings usually help to confirm the diagnosis of aneurysm of the aorta: (1) Pain; (2) cardiac symptoms; (3) murmurs; (4) positive Wassermann (70 to 85 per cent); (5) variation of pulse on either side; (6) pulsation of the tumor under the fluoroscope.

The symptoms produced by a dermoid cyst in the superior mediastinum are the same as those of any innocent tumor, the severity of the symptoms being in proportion to its size. Dyspnea, cough, sputum and pain are those commonly noted. When ulceration into the trachea occurs, hair in the sputum is diagnostic.

In intra-thoracic goiter there is an up and down movement synchronous with swallowing which may be detected by the fluoroscope. This up and down movement is characteristic of goiter and occurs in no other condition. This finding would naturally be absent in a large intra-thoracic goiter held tightly against the upper inlet of the thorax by a short pedicle.

En passant, I would like to draw your attention to an important article by Evan and Leucutia,² who state that valuable information regarding the types of tumor cells present can be gained by observing the effect of radiotherapy.

In discussing the diagnosis, two questions arise: (1) Can a goitrous tumor occur in the thorax attached to an otherwise normal thyroid

in the neck? (2) Is it possible to have an intra-thoracic goiter not attached to the thyroid gland (i.e., developing from aberrant thyroid tissue)? These two conditions must be extremely rare but their occurrence is mentioned in the literature. Kocher in his book "Operative Surgery" mentions the pedicle being attached to a normal

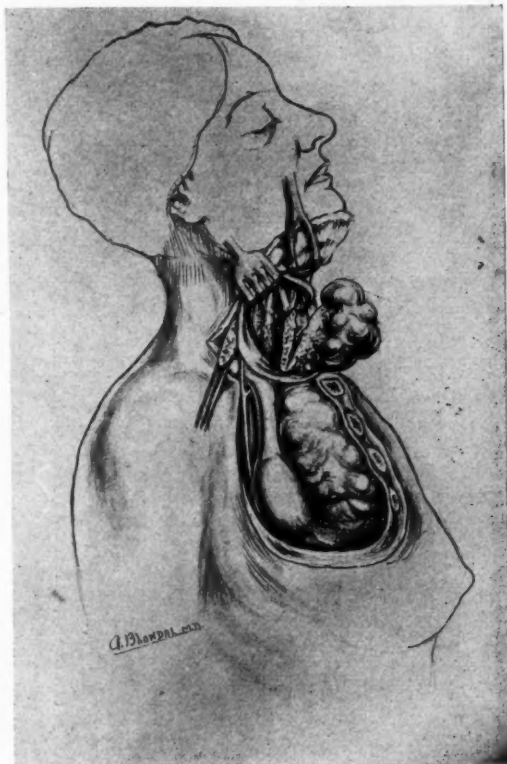


Fig. 1. The lobe in the neck when resected makes an efficient handle for delivering the goiter from the thorax.

or goitrous lobe in the neck. Bevan³ records a most interesting case of an intra-thoracic goiter where no thyroid gland could be found in the neck. The usual thyroid vessels passed into the thorax, supplying the tumor, which appeared to be all the thyroid the patient had.

Aberrant thyroid gland tissue has been found in the following situations:

1. In the mediastinum at the aorta.
2. Near the hyoid bone, base of the tongue and along the thyroglossal tract.
3. Behind the pharynx.
4. Within the larynx and trachea (intra-tracheal goiter).

5. In the pleura (Osler).
6. In the fontal sinus (Prowse).
7. In the ovary (Mayo-Maclean).

INDICATIONS FOR OPERATION

It is questionable whether the incidence of malignancy in adenomatous goiter is, in itself, sufficient indication for the removal of all adenomatous goiters occurring in the neck.

Added to malignancy, the frequency with which toxic symptoms develop increases the urgency for operation, especially in those over forty years of age.

The incidence of toxicity and malignancy is higher in intra-thoracic goiter. Jackson⁴ states that 2 per cent become malignant and 30 per cent toxic. Wuhrmann⁵ examining ninety-one tumors of the thyroid occurring in the mediastinum found seventy-five benign and sixteen malignant (21 per cent).

Apart from the pressure symptoms and the possibility of malignancy and toxicity, it is most imperative that intrathoracic goiters should be diagnosed early and removed. In this stage the operation can with very little difficulty be performed. If left till they are of large size they become one of the greatest problems of surgery.

SURGICAL TREATMENT

It is not within the scope of this address to discuss x-ray and medical treatment of this condition. Those who are interested can find excellent articles on the subject, one in particular, on irradiation in substernal goiter by Grier⁶ of Pittsburgh. My own cases had medical treatment and one at least a thorough course of deep x-ray therapy without the slightest relief.

The anesthetic is very important. Many men use local anesthesia. My preference is nitrous oxide gas and oxygen but this must be given by one specially trained. In case of tracheal collapse it is necessary to have a machine by which the gases can be administered at a pressure greater than that of the atmosphere. In one case of tracheal collapse ("scabbard trachea") Dr. Webster kept the patient going for twenty minutes until both lobes were removed, when the patient began to breathe easily. This case, which was not intra-thoracic, without the aid of this special apparatus would have required a tracheotomy.

For intra-thoracic goiter operations, I have a special long flexible tracheotomy tube always at

hand, though so far it has not been necessary to use it. It is a great misfortune to have to resort to tracheotomy, but an emergency may arise necessitating it. Another alternative is the intratracheal tube but its insertion is not without danger when the trachea is distorted.

In every goiter operation the lower pole of each lobe should be examined for extension down-

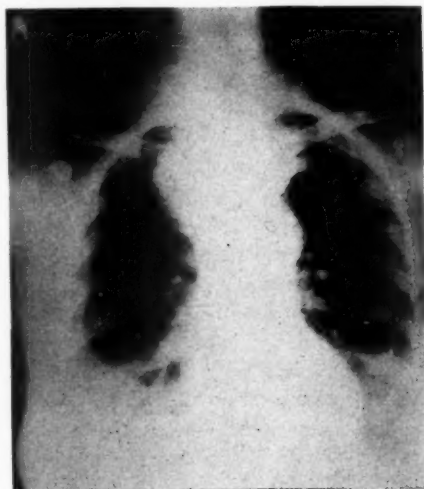


Fig. 2. X-ray plate of intra-thoracic goiter. The arch of the aorta is displaced slightly to the left.

ward. In one patient seen and examined by two diagnosticians, an intra-thoracic goiter the size of a baseball was found at the operation attached to the right lobe of a rather small adenomatous goiter. No one had suspected such a condition to be present on examination.

OPERATIVE TECHNIC

An intra-thoracic goiter may, as pointed out, be entirely within the thorax without any attachment to the thyroid gland. Surgically it would have to be dealt with as a benign mediastinal tumor.

The usual type of intra-thoracic goiter is one which is attached by a narrow pedicle to the lower pole or isthmus of the thyroid gland in the neck. The thyroid gland may itself be normal or in a condition of goiter, usually the latter. The method of approach should always be from the neck. The low collar incision has many advantages over the lateral or the vertical incisions. In none of my cases was it necessary to detach the sterno-cleido-mastoid muscle from its

attachment to the sternum or clavicle. The infrahyoid muscles, which I seldom cut across except in removing very large goiters, were divided transversely. *The keynote in the operation is to ignore entirely the intra-thoracic portion, until the goiter in the neck has been resected* (Fig. 1). This is done as in the ordinary operation of bilateral resection with the one exception that the lobe to which the pedicle is attached is divided so that the portion removed remains attached to the pedicle. The resection of the lobe should be from above downward, cutting through the gland and dividing the isthmus. As the pedicle is approached it is carefully separated with the finger, keeping close to its posterior surface so that the recurrent laryngeal nerve is displaced backward out of danger. The last part between the conserved portion and pedicle is now clamped and divided. The anterior part of the lobe is now free in the neck but attached by the pedicle to the tumor in the thorax. Using the lobe as a handle, the index finger is passed carefully around the upper part of the tumor, separating the loose cellular adhesions, thus freeing it from the structures in the mediastinum. The tumor can now be pulled out of the thorax. Any remaining attachments are caught with forceps before being stripped from the tumor. These attachments are ligated and the ends of the ligatures left long. This serves a two-fold purpose. Not only is bleeding controlled but the obliteration of the cavity which occurred when the tumor was dislodged, being as it were turned inside out, is maintained by stitching the ligatures to the sterno-mastoid muscle, just above the clavicle. By this procedure the period of drainage is shortened several weeks from what would have occurred were the cavity packed with gauze. The intrathoracic pressure causes the lungs to occupy the space. Light packing or tube drain as in ordinary thyroidectomy is used in the neck.

Should the tumor prove too large to be delivered through the upper opening of the thorax (i.e., more than 10.5 cm., in the transverse diameter) two methods may be resorted to:

1. A cyst may be tapped and the collapsed wall pulled out of the thorax.
2. A solid tumor may be reduced in size by morcellation, being careful to keep within the capsule. The blood supply to the tumor having been cut off from above by resection of the

lobe, bleeding from the surrounding adhesions should not be alarming. The relative measurement of the tumor and the thoracic inlet can be taken from the x-ray plates.

Trans-sternal mediastinotomy is a procedure that I think should be very rarely called for in this condition. I have reviewed the literature

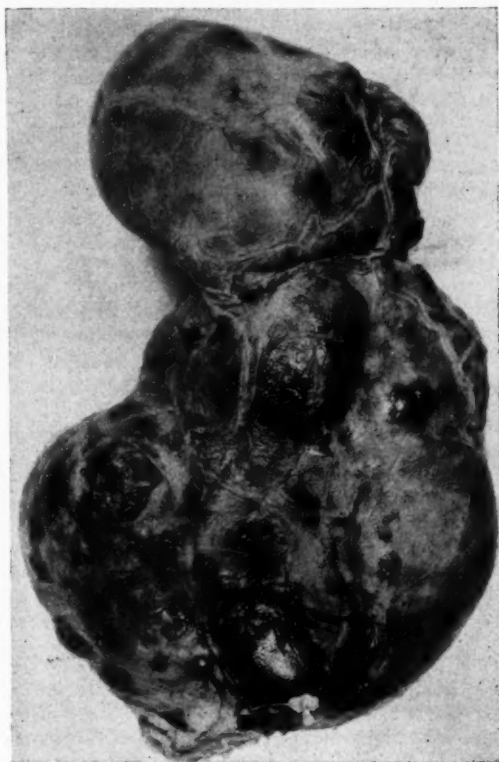


Fig. 3. Pathological specimen. Intra-thoracic portion measured 10 cm., being slightly less than that of the superior thoracic inlet (transverse diameter, 10.5 cm.).

of some of the cases of intra-thoracic goiter removed by anterior mediastinotomy and from measurements of the tumor in the radiograms compared with that of the superior inlet of the thorax (10.5 cm.) it would seem that this extreme measure is sometimes done unnecessarily. While the operation undoubtedly has its place, it is interesting to note that in Hunermann's⁷ report of 500 operations for substernal and intra-thoracic goiter at Innsbruck, mediastinotomy, as advocated by Sauerbruch, was found necessary only once.

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DISCUSSION

DR. ARTHUR T. MANN (Minneapolis): The subject being discussed tonight is certainly an exceedingly interesting one. Intra-thoracic goiters are not common, but we probably all have had some. I have had quite a few and one or two more than I have wanted. I do not believe Dr. Maclean has expressed himself quite strongly enough on the seriousness of the operation and the results of the operation in some of these cases.

One of the first ones I had was the sister of a doctor who was in the operating room at the time and was assisting with the operation. We were using the gas oxygen anesthesia. There is one thing about the nitrous oxide and that is that all the veins are full. They are full of blood and they bleed if you happen to cut any of them or tear any of them, and the tumor is larger than it usually is because of the blood supply which engorges it. I don't think I ever tried an intrathoracic goiter again with the gas oxygen anesthesia. Of the general anesthesia, I certainly would prefer the quiet of the ether anesthesia.

I think the doctor is absolutely right in his method of attack. If you will separate the isthmus early you will get a mobility which you do not have when the isthmus is not separated. Then, by taking care of the superior vessels you are able to get considerable more mobility. In this case it was easy to get a finger around and get the lobe loosened, but every time we tried to get the tumor up the patient stopped breathing, so I would let it back and take another try and each time I got it a little more loosened. These glands are not absolutely solid but molded, as a baby's head is molded, as they come through this space. We got to the point where I looked at the doctor and said, we better take a chance. For part of a minute she stopped breathing and by the molding of this tumor we got it out but it was a moderately desperate case. After it was out her color came back and she started breathing. Fortunately, we had no collapse of the trachea.

Some of these goiters come out easily. The distance from front to back is short and when the mass is large there is where the trouble arises. The distance from side to side is ample so these tumors have to be molded sometimes and you have to stop the breathing to get them out in this way. Sometimes tumors will be fairly firm and it will be almost impossible to do that. There are a number of small vessels that

run into the gland from below. You can take some of the glands out either by breaking them up with the finger and when the bleeding begins put some gauze in and hold it until the bleeding stops and then you will make the mass of the tumor smaller so that it can be worked through.

I had one case which pretty nearly raised my hair on end. I did this under local anesthesia and had a well contained woman to start with and she helped me all the way through. If I had had another type of person I am afraid I should have had a great deal of difficulty. She had one of these tumors which are rather difficult to take out, but it came out, everything just as nice as possible. I spoke to her and she answered me. She said she was feeling all right. Immediately after that she stopped breathing; had a collapse of the trachea. We had the tracheotomy sets ready because I was a little afraid she might get a collapsed trachea, but the long tube which is flexible I could not find so I took the longest one I had, did a tracheotomy and put it in and we got her breathing very nicely. She had a spell of coughing at the end of the second day. We pulled the tube out and put it back and she was all right at that time. About every six hours she would have another spell of coughing. There was a length of about one-half to three-fourths of an inch inside of the lower end of the outside tube which was in the trachea and there the mucus was collecting. By pushing the inner tube down a little and pulling it out, we got the bulk of the mucus on the tube. After that we kept the inside cleaned out. She made a very good recovery up to the time I told her she could go home. That day she had an embolism of the lung with the pallor, small and rapid pulse, and shock, and it looked as if she was going to go. She became better in two or three days, however, and went home a week after that. We had not only the collapse but the embolism in her case.

A collapsed trachea is a very serious thing and it does not always collapse when you are through with the operation but may collapse later on with a sudden inspiration. The trachea is so thin that it is more or less like a double ribbon and a good deal like a valve on some of the gas masks. When it is once collapsed you have your trouble and you have it right away. The tracheotomy set should be left at the bedside and everybody cautioned so that they will look out for this condition.

In the case of a collapse with a tracheotomy tube in place, when can you pull the tube out? When the granulation tissue fastens the soft trachea to the parts around it.

In an emergency, if no tracheotomy tube is at hand, the end of a stomach tube can be used for the purpose, or a good sized catheter with the end cut off.

DR. F. A. OLSON (Minneapolis): I wish to congratulate Professor Maclean on his splendid presentation of this subject and also to congratulate the society on its opportunity to hear him.

The diagnosis of tumors in the upper chest, such as true intrathoracic goiter, has always been of keen in-

terest. Doctor Maclean has covered the field in a very thorough manner. I would like to add, however, that the fluoroscopic examination should never be omitted in any case of doubt. The stereoscopic radiograph will not always settle the question. It is particularly necessary to take sufficient time to fully relax the accommodation when using the fluoroscope. The expansile or transmitted pulsation, together with the location, contour, relationship to other organs, the variation in density, etc., frequently defines the lesion.

It is assuring to any operator if he will remember that an intrathoracic goiter is always encapsulated, and, however close it may be to highly vital areas, there are no large vessels that lead directly into it.

DR. MACLEAN (closing): I hope I have not minimized the dangers of attempting to remove an intrathoracic goiter. I mentioned that I always have practically everything at hand that one can have in case of accident or emergency and the two dangers as I see them are collapse of the trachea and bleeding. Of the two, I think collapse of the trachea is very much more serious, as it is more difficult to control.

These tumors start in the neck and grow downwards. They originate as a rule in the neck and gradually work down in the chest. It is easier for them to grow into the chest once they are below the inlet than in any other direction. The blood supply is all from up in the neck and not from the vessels in the thorax. I think if you have controlled the bleeding by resecting

the lobe in the neck, which is a point I do not think is mentioned by many writers, there should not be much bleeding from the thorax. I do not think it is necessary to ligate the inferior thyroid outside of the capsule. We used to do that in goiter operations many years ago but in the ordinary bilateral resection not many are doing that now and that stage is practically the same as an ordinary goiter operation. The only point is you keep the lobe in the neck attached to the pedicle to be used in the further manipulation of the intra-thoracic portion.

Dr. Mann mentioned that you can use a stomach tube or catheter in collapse of the trachea. They can be used of course—a flexible rubber tube in case one has no tracheotomy tube. If you are up against it, sometimes the stomach tube with the opening at the side and end would be the ideal thing or an intratracheal tube could be passed quickly into the trachea through the larynx.

I have not had any very dangerous cases; that is, the tumors were not especially large, not too large to be delivered through the upper opening of the thorax. These cases should be diagnosed before they get too large, because then they are easier to remove.

Fluoroscopy was mentioned by one of the doctors here tonight. Fluoroscopic examination in a definite case may save the patient from going on to the expense of x-ray plates. If plates are made they should be stereoscopic. X-ray plates are important if there is any doubt in the diagnosis.

THE TUBERCLECID FRAUD

Charles F. Aycock, "Consumption Cure" faker, has been debarred from the mails. He has for years sold a fraudulent "cure" for consumption called "Tuberclecid." This nostrum was exposed seventeen years ago; at that time Tuberclecid sold at \$15 for a two-ounce bottle and was found by the A. M. A. Chemical Laboratory to be essentially a solution of cresote, or guaiacol, in olive oil. Eleven years ago, he was prosecuted in California, but the case was dismissed. Since then, Aycock has continued to defraud the tuberculous public, until finally the postal authorities have proceeded against him for fraudulent use of the United States mails. About January 1, 1928, a fraud order was issued against the Aycock Medical Institute, Aycock Medicine Company, Aycock Medical Company and Charles F. Aycock. There is reason to believe, however, that Aycock is evading the order by doing business under the name "Tuberclecid Institute," 402 Delta Building, Los Angeles, California. (Jour. A. M. A., March 3, 1928, p. 710.)

ARGYROL OMITTED FROM N. N. R.

Argyrol is included in New and Non-official Remedies as a brand of mild silver protein, U. S. P. At the expiration of the period for which Argyrol stood accepted, the Council on Pharmacy and Chemistry informed the A. C. Barnes Company that the advertising claims for therapeutic efficacy of this product went beyond those of mild antiseptic or protective value allowed for mild silver protein and asked that the firm present evidence to substantiate these claims; the firm was also informed that in order to permit the continued acceptance of the product the labels and advertising must bear the pharmacopeial title, mild silver protein, as a synonym. The firm presented no satisfactory evidence for the therapeutic claims in question and refused to mention the pharmacopeial name on the labels and advertising of Argyrol. The Council therefore voted to omit Argyrol from New and Non-official Remedies and authorized publication of its report explaining this action. (Jour. A. M. A., March 17, 1928, p. 849.)

PERINEPHRIC ABSCESS*

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IN THE usually accepted classification perinephric abscess has been considered as primary or secondary, depending on whether the infection was thought to have originated in the perirenal tissues and proceeded to abscess formation or whether the infection started in the kidneys and spread secondarily to the perirenal area. There are no clinical or experimental data to support the view that perinephric abscess originates primarily in the perirenal tissues. Hunt, in a recent review of the literature, and in cases observed in the Mayo Clinic, was unable to find a single instance in which primary infection of the perirenal tissues resulted in abscess formation independently of primary renal or extrarenal infection. He proposes a classification of perinephric abscess on the basis of etiology, such abscesses being of renal or extrarenal origin. Those of renal origin are caused in order of frequency by pyonephrosis, lithiasis, tuberculosis and traumatic rupture of the kidney. Those of extrarenal origin are the result of metastasis, largely to the renal cortex followed by direct extension to the perirenal tissue. It is my purpose to consider here the second group, namely, perinephric abscess of metastatic or extrarenal origin.

Perinephric abscess, not secondary to primary disease of the kidney, is a fairly common condition, often undiagnosed, especially in the early stage. When it is accompanied by disease of the kidney attention is focused on the renal area and the condition is not likely to be overlooked. However, with the insidious onset and lack of localizing symptoms so characteristic of the metastatic type of perinephric abscess, the condition must always be kept in mind in order to secure a successful termination.

ETIOLOGY

Brewer, reviewing the work of other investigators and combining it with extensive experimental and clinical observation of his own, concludes that during the progress of any acute in-

fection a certain number of microorganisms find their way into the blood stream and that many of them are excreted through the kidney. If the number of these is comparatively small, if their virulence is low and if the kidneys are in a fairly healthy condition, the transit of these organisms does not give rise to demonstrable lesions. If, on the other hand, the number of organisms is large, if their virulence is high and if both kidneys are diseased, lesions are produced which may go on to any of the types of renal infection or suppuration. Brewer believes that hematogenous infection accounts for a large proportion of renal infection and this contention is borne out by the work of Rosenow on the elective localization of bacteria. Cope, Richardson, Hunt and many others have called attention to the frequency with which perinephric abscess follows acute superficial infections, such as boils, carbuncles, tonsillitis and abscess, and dysentery. Organisms from such areas of infection travel to the kidney by way of the blood stream, often producing one or more cortical abscesses. The usual organism is the *Staphylococcus aureus*. The abscess follows the line of least resistance and spreads peripherally. The fibro-fatty capsule of the kidney is lax, cellular and not extremely vascular and offers little resistance to the spreading infection. Such a metastatic cortical abscess secondary to superficial infection is probably the most frequent cause of perinephric abscess.

Braasch, in 1915, reported a series of sixty-seven cases of perinephric abscess; 18 per cent of these were definitely proved to be secondary to cortical abscess. In 21 per cent the cause was not determined; however, he concluded that they were due in all probability to cortical abscess. Hunt, in 1924, pointed out the relationship between cortical abscess and perinephric abscess. He analyzed 106 cases of perinephric abscess and showed that 55.7 per cent were not associated with any demonstrable primary renal lesion and concluded that they followed on cortical abscess. A cortical abscess may at times spread centrally, breaking through the pelvis of the kidney and

*From the Division of Medicine, Mayo Clinic, Rochester, Minnesota. Read before the Southern Minnesota Medical Association, Austin, September 30 and October 1, 1927.

Case	Age	Sex	Predisposing diseases	Duration of symptoms, weeks	Loss of weight, pounds	Temperature	Urine	Hemoglobin, per cent	Leukocytes, (thousands)	Situation of abscess, side	Stay in hospital, days	Temperature normal, days	Result
1	59	M	Tonsillitis; boils	1	20	100	Normal	61	17.7	Right	8	3	Cure
2	55	M	Abscess on finger	6	33	99 to 101	Trace of albumin	86	15.5	Left	14	7	Cure
3	48	M	Tonsillitis; quinsy	2	17	99.2	Normal	80	18.2	Right	6		Continued draining sinus; died one year later
4	23	F	Influenza; diarrhea	6		101	Normal	48	23.4	Right	33	27	Cure
5	39	F	Appendiceal abscess; tonsillitis.	20	75	100.2	Occasional pus cell	40	16.0	Right	33		Developed parotitis and pneumonia died
6	32	M	Acute swelling at elbow	2		101.8	Normal		13.0	Right	13	2	Cure
7	48	M	Boils	8		101	Trace of albumin; occasional pus cell	68	14.4	Left	13	7	Cure
8	22	M	Boils	4	Marked	99	Trace of albumin		17.4	Right	12	2	Cure
9	39	M	Rectal abscess	40		101	Trace of albumin			Right	10	3	Cure
10	14	F	Tonsillitis	1		102	Trace of albumin	49	18.4	Right	10	3	Cure
11	45	M	Carbuncle	12		99	Trace of albumin	35	24.4	Left	14	2	Cure
12	29	M	Carbuncle	6	60	99 to 104	Trace of albumin	60	23.2	Right	14	5	Cure
13	39	M	Infection of finger	4		100 to 104	Trace of albumin; occasional pus cell	30	18.2	Left	17		Died from general sepsis
14	27	M	Series of boils	6	30	102	Few pus cells	55	16.5	Right	21		Had a second drainage; cure
15	25	M	Boils	3	12	100	Normal			Left	14	5	Cure
16	48	M	Boils	5	Marked	105	Normal	45	14.4	Left	12	4	Cure
17	44	M	Boils	3		100.2	Normal		12.8	Left	10	5	Cure
18	63	M	Boils	4	30	99 to 102	Normal		20.0	Right	14	4	Cure
19	18	F	Injury to back; boils	3		98	Normal	70	22.4	Left	6	2	Cure
20	39	M	Cold; tonsillitis	1		104	Normal	80	18.6	Right	10	3	Cure
21	22	F	Boils	6		100 to 103	Normal	68	15.2	Left	10	2	Cure
22	30	M	Tonsillitis; boils	5	15	100 to 102.8	Trace of albumin	62	16.4	Right	22	19	Cure
23	14	F	Tonsillitis	8	24	102.4	Normal	49	18.4	Right	10	3	Cure

ANALYSIS OF CASES

Case	Age	Sex	Duration of symptoms, weeks	Loss of weight pounds	Temperature	Urine	Hemoglobin, per cent	Leukocytes (thousands)	Situation of abscess, side	Stay in hospital, days	Temperature normal, days	Result
24	15	M	2		105	Trace of albumin	75	20.0	Right	16	12	Cure
25	21	M	2		100.5	Normal	55	18.6	Right	30	24	Cure
26	61	F		Marked	101	Few pus cells		20.0	Right	15	2	Cure
27	60	M	6	15	102	Trace of albumin	88	21.8	Right	7	2	Cure
28	36	M	3		99.2	Normal; three examinations	65	18.9 21.4	Right	19	5	Cure
29	35	M	4	25	104	Normal		18.6 22.6	Right	9	2	Cure
30	54	M	1		103	Normal	40	25.2	Right	16	3	Cure
31	24	M	9	15	103	Trace of albumin	83	16.2	Right	13	4	Cure
32	51	M	3	30	99.4	Normal	54	16.3	Right	16	3	Cure
33	15	M	6		100.8	Normal		13.9	Right	14	2	Cure
34	24	M	4		99.4	Sediment; normal sugar	65	26.7	Right	11	2	Cure
35	55	M	2		99.2	Normal		20.0	Left	10	2	Cure
36	39	M	6	Marked	100.4	Normal	60	21.0	Left	16	6	Cure
37	23	M	10	Marked	100	Normal	80	13.5	Right	11	2	Cure
38	27	F	7	35	101	Normal	65	17.4	Right	12	2	Cure
39	27	M	4	21	100.2	Normal	80	14.2	Right	15	3	Cure
40	38	M	4	Marked	101.6	Normal	68	17.0	Left	11	3	Cure
41	30	M	4	25	104	Normal	67	12.8	Right	15	3	Cure
42	15	M	1	Marked	100.4	Normal	49	25.4	Right	13	6	Cure
43	35	M	5	20	100	Normal	60	16.6	Right	14	4	Cure
44	28	M	3	15	101	Normal	72	23.9	Left	16	7	Cure

causing symptoms of pyonephrosis, but the peripheral extension to the perinephric tissue is by far the more common.

Infection by direct extension to the perirenal tissues through the lymphatics accounts for a smaller group of perinephric abscesses. Miller has reviewed the lymphatic circulation of perirenal tissue in its close relation to the retroperitoneal lymphatics. He has shown that infection may travel from the lower urinary tract and genitalia without directly involving the kidneys. Jaffe's case of perinephric abscess following acute gonorrhea and Jordan's case following acute orchitis bear out this contention.

Bilateral perinephric abscess is uncommon. Hunt noted nine cases in the literature. He reported one of Ritchie's cases and added one of his own to the list.

SYMPTOMS

The clinical course of perinephric abscess is best divided into two stages, that of symptoms only, and that of symptoms and localizing signs.

The onset may be sudden with a severe chill, high temperature and generalized aching. In the absence of localizing symptoms, the condition may be easily mistaken for influenza. However, the usual onset is insidious; the patient is easily fatigued, he feels out of sorts, perspires easily, often has sensations of chilliness, and slight fever, reaching as high as 100°, especially in the afternoon. During this stage, which lasts from one to four weeks, the appetite is lost with consequent loss of weight, and a slight degree of secondary anemia is evident. The leukocyte count may be normal or slightly elevated, there may be urinary frequency or nocturia. Nausea and even vomiting are not uncommon. During this stage there are usually no localizing symptoms and because of the continuous afternoon fever and the rather rapid decline in the patient's general health, tuberculosis or typhoid fever is often suspected.

After a variable length of time during which the patient may have become bedfast, the elevation of temperature continuing or increasing, lo-

calizing signs in the renal area or thorax develop. The patient usually complains of a steady, dull aching type of pain in the costovertebral angle on the affected side. This pain is mild at first and may be relieved by aspirin and heat but gradually becomes so severe that codeine and even morphine are required. Tenderness over the renal area anteriorly and over the lumbar muscles posteriorly on pressure is the rule. However, at times no tenderness can be elicited. If the abscess happens to be large or is situated at the upper pole, elevation of the diaphragm and compression of the lung may result in signs indicating pleural effusion or pneumonia. Actual pulmonary complications such as bronchopneumonia, pleural effusion and pulmonary abscess are not infrequent. If a mass becomes palpable, the diagnosis becomes simpler; however, this sign is present only in about two-thirds of the cases. During this stage of the disease the leukocyte count is uniformly high; the temperature is remittent, reaching as high as 105° in the evening. Daily chills are not uncommon. The urine is usually normal except for varying amounts of albumin; occasionally red blood cells and pus cells will be noted on microscopic examination. The diagnosis is rarely made during the early part of the disease before localizing signs have appeared; unfortunately, however, the diagnosis is often delayed when all the signs and symptoms are present. Because of the close relationship between superficial infection and perinephric abscess, the possibility of such antecedent infections should always be borne in mind. Often this lesion is obvious; sometimes it is not. The patient frequently fails to tell of previous attacks of boils because he thinks they are of no significance or because he has completely forgotten them. The lesions may have been so mild as to have escaped the patient's observation completely.

Elmer has called attention to the similarity of the symptoms of perinephric abscess and tuberculous disease of the hip and spine in children. In the early stages, when there is mild fever, malaise, loss of appetite and slowing of the activities of the child, pain on motion of the spine and leg may suggest a tuberculous process. Roentgenologic studies of the bones, a history of antecedent superficial infection and rapid progress of the disease should aid in the diagnosis.

TREATMENT

Few cases of perinephric abscess of metastatic or extrarenal origin require more than simple drainage. This is best accomplished through the usual posterior incision for operations on the kidney. Occasionally second drainage is necessary.

COMPLICATIONS

Early diagnosis is extremely important in order to avoid the usual complications of perinephric abscess. The abscess, if situated at the upper pole of the kidney, may extend through the diaphragm into the pleural space, causing empyema or lung abscess. It may extend deeper into the substance of the kidney, destroying so large a part of it that nephrectomy may later be necessary. The abscess may extend along the course of the psoas muscle and point in the groin, or extend posteriorly and point in the back.

ANALYSIS OF CASES

Forty-four cases were selected in which, so far as could be determined, there was no evidence of primary renal disease predisposing to perinephric abscess, such as pyonephrosis, lithiasis, tuberculosis or traumatic rupture. In seven cases in which there was a question of primary renal disease cystoscopic examination was undertaken to exclude it. Some of the cases analyzed were included in Braasch's report in 1915 and Hunt's report in 1924. I have added cases which have come under our observation since 1924. Of the forty-four cases there was a definite history of superficial infections, such as boils, carbuncles, abscess and tonsillitis, in twenty-three. In the remaining twenty-one cases no such infection was reported. It is believed, however, that in almost 100 per cent of cases of perinephric abscess of extrarenal origin there will be a history of such an infection preceding the onset of the abscess.

The ages of the patients in this group varied between fourteen and sixty-three; 70 per cent of these were in the second, third, and fourth decades. The disease occurred most frequently between the ages of twenty and thirty. Thirty-six of the patients were males and eight females, a ratio of 4.5 : 1. The time between the onset of symptoms and surgical treatment varied between one and forty weeks, the average being five and

six-tenths weeks. There was a significant loss of weight in all cases. The urine was normal except for a trace of albumin and an occasional pus cell; in one specimen sugar was found. The hemoglobin varied between 30 per cent and 88 per cent, the average being 53 per cent. The leukocyte count varied between 12,800 and 34,400. The abscess was found on the right side in thirty-one instances and on the left in twelve, a ratio of 2.5 : 1. In one case there were bilateral abscesses. The temperature varied between 99° and 105°. The temperature was normal in an average time of five days following drainage of the abscess. Pain over the site of the infection was present in all cases. In three cases there was no tenderness over the area of the abscess on palpation. In thirty cases (69 per cent) tumor was palpable. In seven cases roentgenograms and physical signs indicated elevation of the diaphragm on the affected side. Three of the forty-four patients died (a mortality of 6.8 per cent). One died a year after operation; another with bilateral perinephric abscesses died seventeen days after operation from generalized sepsis, and the third, seven days after operation from pneumonia and parotitis.

SUMMARY

The classification of perinephric abscess is best made on an etiologic basis, the abscess being of renal or extrarenal origin. Perinephric abscess of renal origin follows on pyonephrosis, lithiasis, tuberculosis and traumatic rupture of the kidney. Perinephric abscess of extrarenal origin is the result of metastasis to the renal cortex, as a rule, followed by direct extension to the perirenal tissue. Forty-four cases of perinephric abscess of extrarenal origin have been analyzed. Cortical abscess was the most common direct

cause of the perinephric abscess. Metastatic perinephric abscess frequently follows superficial infections, such as boils, carbuncles, abscess and tonsillitis. The usual etiologic organism is *Staphylococcus aureus* which travels by way of the blood stream. Perinephric abscess may also result from metastasis along the lymphatics.

The symptoms are localized pain, fever, chills, leukocytosis and the general appearance of sepsis. The urine is practically always normal. Early diagnosis is important. The treatment is simple drainage.

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PANCREPATINE

The Anglo-French Drug Co., which markets "Pancrepatine A. F. D.," has not requested an examination of the preparation by the Council on Pharmacy and Chemistry. "Pancrepatine A. F. D." is stated to be "a combination of a Special Extract of the Pancreas and Hepatic Extract . . ." It is claimed that the oral administration of the preparation results in "reduction of glycemia" and "reduction and sometimes total disappearance of glycosuria." There is no convincing evidence to show that any preparation taken by mouth is an effective means of producing the char-

acteristic action of insulin. (Jour. A. M. A., March 3, 1928, p. 714.)

BiSoDol

The advertising of the "BiSoDol Company" states that BiSoDol is composed of "Bismuth Subnit-Magnes. Carb.-Sodium Bicarb.-Carica Papaya-Diastase-Ol. Menth-Pip" but contains no information in regard to the amount of each ingredient. The Council on Pharmacy and Chemistry has not examined the preparation nor has the A. M. A. Chemical Laboratory considered it worth while to analyze this "shotgun" mixture. (Jour. A. M. A., March 10, 1928, p. 793.)

SOME POINTS IN THE TECHNIC OF PREOPERATIVE AND POSTOPERATIVE TREATMENT OF NON-MALIGNANT HYPERTROPHY OF THE PROSTATE*

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ALL urologists recognize the necessity of careful pre-operative treatment before prostatectomy, and consider this the most important step in the treatment of prostatic cases. It has reduced mortality following operation to about 3 per cent. A few surgeons have reported as many as two hundred consecutive operations for the relief of hypertrophy of the prostate with no mortality, and a recent study of these reports shows that these surgeons have every facility for carrying out thorough preoperative treatment before surgery is advised. Surgeons having such a low mortality rate must eliminate those patients who are poor surgical risks. A complete general physical survey is the only competent method of determining whether or not a patient is a poor operative risk. The small number of deaths that still occur following careful preparative treatment and prostatectomy is caused by the usual accidents that attend any major surgical procedure, together with certain factors which may be recognized before operation.

It is this group of cases that has occupied our attention in an attempt to further reduce mortality following prostatectomy. In our experience, a careful, thorough history and repeated physical surveys will discover many pathologic conditions which contraindicate operation in some instances, and in others indicate definite methods of procedure, which, if not followed, may result in the patient's death. In cooperation with other members of the staff of the Nicollet Clinic, we make an intensive study of each patient who may have to submit to prostatectomy. We have included in this paper certain phases of our study which have helped us in discovering conditions which might have been overlooked if the study were not comprehensive. We

have stressed certain other portions of our pre-operative technic which have helped us to discover physical conditions which were not obvious and which if undiscovered might produce mortality following operation.

PREOPERATIVE TREATMENT

Past History.—From experience, we realize that a complete history is just as important in the diagnosis and treatment of hypertrophy of the prostate as in any other medical or surgical lesion. Frequently we have been able to map out a successful method of preoperative treatment which might not have been possible if the history had not indicated that possibly we were dealing with some condition other than hypertrophy of the prostate alone. In one instance, after much questioning, we found that a patient had had a vascular accident which produced a slight hemiplegia for a few hours. This history obviously assisted us in determining just what and how much preoperative treatment should be instituted. In another case, the history of a previous heart attack made it possible for us to discover with the electrocardiograph that the patient did have a heart lesion which we might otherwise have overlooked. A history of nervous exhaustion is important, because it indicates that the patient does not have a stable nervous system. A history of urinary difficulty beginning in the early forties should make one suspicious of some condition at the bladder neck other than non-malignant hypertrophy of the prostate, and should encourage the urologist to make a complete and thorough examination of the nervous system, including a spinal fluid test. The cause of a so-called cord bladder can be discovered if a thorough history is taken.

Complete Physical Survey.—Following the completion of the history, and after all facts obtainable are weighed and their significance determined, a complete physical survey is essen-

*From the Department of Urology and Dermatology, The Nicollet Clinic, Minneapolis. Presented at the Fourth Annual Meeting of the North Central Branch of the American Urological Association, Madison, Wisconsin, Oct. 14 and 15, 1927.

tial. This survey should include every organ because, as with the history, data may be obtained which will assist the surgeon in determining the best method of preoperative treatment. Frequently the survey will show that the patient should not be considered a risk for operative treatment.

The examiner should pay particular attention to the heart and kidneys. Many patients have died unexpectedly as the result of preoperative treatment because the physical survey did not reveal a definitely damaged heart muscle which could not withstand the added work incident to decompression of the bladder. In the examination of the heart we find the electrocardiograph a necessary adjunct to our routine, since it frequently discloses a lesion which would otherwise not be found. Following the examination of the heart, the internist always advises therapy if necessary, which is started immediately under his direction.

Foci of infection should be searched for as carefully as in a case of arthritis. They may exaggerate the enlargement of the prostate because of prostatitis. Thus, it may be discovered that a heart condition is not entirely the result of urinary retention, but is secondary to chronic infection. Renal damage may be partially due to chronic infection, the result of removable foci. Foci of infection may also cause pyelonephritis to persist after operation.

After the physical survey has been completed and all pathologic conditions noted and removed, or treated when possible, we then turn our attention to renal function. Renal function damage is the most frequent lesion found with hypertrophy of the prostate. It may be the result of back pressure, or infection, or both. Complete blood studies for evidence of urea retention are important. These should be made before the patient has had a catheter passed and before the examination of the urinary tract, because, in some instances, following the removal of only an ounce of residual urine from an over-distended bladder, the blood chemistry findings indicate a sudden increase in the urea retained in the blood. Fifty per cent more urea may be present than was noted before catheterization or decompression. The amount of increase in the blood is usually the red flag which indicates to the urologist how carefully he must proceed with the preoperative treatment. A patient with a

blood urea of 100 and a creatinin of 5.5 should be treated very carefully, while an individual with two ounces of residual urine, whose blood chemistry is normal, obviously can receive more drastic treatment. The phenolsulphonephthalein or other dye test cannot be used satisfactorily before decompression is completed.

X-Ray Examination.—An x-ray examination will reveal the presence of a renal, ureteral or bladder stone. When the decompression has been completed, bladder diverticuli may be discovered by injecting a shadow-casting medium into the bladder. Unsuspected bladder malignancy may be found with the cystogram. Deformity of the bladder neck, produced by hypertrophy of the prostate, may be seen after the bladder has been filled with sodium iodide, and is sometimes of diagnostic value.

Examination of the Urinary Tract.—The surgeon should be very thorough in his examination of the urinary tract, since tumors of the kidney may be palpated when the history or the findings do not give a clue to their presence. In one or two instances we have found congenital conditions in both kidneys, not revealed by the x-ray or the history, which prevented us from doing a prostatectomy that would surely have resulted in the patient's death. In the presence of symptoms of prostatism, the surgeon should not deny the existence of hypertrophy of the prostate because the finger in the rectum reveals this organ to be flat or not enlarged. A patient may have a bilateral and median enlargement of the gland into the bladder and away from the rectum, so that the palpating finger feels little or no enlargement.

The residual urine test is important, but should be made very carefully and only after the blood chemistry findings have been reported. The removal of a small amount of residual urine as part of a diagnostic test for hypertrophy of the prostate has frequently precipitated uremia. The finding of residual urine in the early case, when the bladder has not been over-distended for a long period, is a useful test and produces no damage. In the absence of an enlargement of the prostate by rectal palpation, the finding of residual urine indicates some condition at the bladder neck which prevents the normal outflow of urine.

Cystoscopy.—In our opinion, every patient suffering with supposed hypertrophy of the prostate should have a cystoscopic examination.

However, we believe that this examination should be made only after complete decompression. Cystoscopy may reveal a complicating cord lesion, diverticuli of the bladder, foreign bodies in the bladder and many conditions at the bladder neck which do not require major surgery. We have been much chagrined in two or three instances, on opening the bladder following careful preoperative treatment wherein the patient had a palpable prostate by rectum, to find a contracture at the bladder neck which would much better have been treated by means of the punch or some such minor procedure.

Gradual Decompression with the Indwelling Catheter.—We routinely practice the one-stage operation, using an indwelling catheter in preoperative treatment. In some instances we find it necessary to do a suprapubic drain when the urethral catheter does not accomplish the desired result in a reasonable length of time. Every patient who is to have his bladder decompressed should be in bed. The catheter should be passed through the urethra as gently as possible, by one experienced in this procedure. The patient should wear a suspensory bandage, and, if he will permit, double vasotomy should be done as soon as possible. This is not advisable before decompression is completed in patients who have a high blood chemistry with large amounts of residual urine, because this simple operation, always done under a local anesthetic, is sometimes enough to precipitate an attack of uremia. The urethral catheter should be held in place by some means, preferably adhesive tape. A screw clamp can be used on the catheter, so that the decompression is intermittent, or the Van Zwalenburg method of continuous decompression may be used. Frequently, as mentioned above, there will be an increase in the blood urea and creatinin during the first two or three days of decompression.

When decompression of the bladder and kidneys is started, the patient should receive not less than 3,000 c.c. of fluid by mouth, by rectum, subcutaneously or by vein. Water is the best medication which a patient with urea retention can receive during this part of his treatment. We must sound a note of warning here, however, concerning the continued use of large quantities of water. In a number of instances we have found that this procedure has produced edema of the lower limbs, and in other instances we have

noted an embarrassment of the heart. We are certain that the continued ingestion of water over a long period of time causes fatigue of the kidneys. When the blood urea and creatinin are high, we are in the habit of giving at least 1,000 c.c. of physiological salt solution or water intravenously one or two times in twenty-four hours. In this manner we have been able to reduce the blood urea and creatinin very rapidly. When the patient is mentally dull and has some drying of the tongue, the intravenous method is the only sure means of introducing fluid into the general circulation. We constantly watch his tongue (which becomes dry quickly), the total output of urine, his mentality, and his ability to take food. In addition to the introduction of large quantities of water, we see that the bowels are evacuated at least once a day, which assists the kidney in eliminating urea and other waste products. During this part of the treatment, particularly with patients who show signs of approaching uremia, the heart action must be watched carefully by a competent cardiologist. We feel that the routine giving of digitalis has done harm in many cases. When patients are being decompressed we are very careful to see that they get sufficient rest; if they are nervous and irritable, and unable to get seven or eight hours' sleep out of every twenty-four, hypnotics are used, and if these are unsuccessful, opiates are given.

POSTOPERATIVE TREATMENT

During operation, particularly when drapes are removed and dressings applied to the wound, the patient must be covered with warm blankets or surrounded by hot water bottles, or some other means employed of conserving his heat. In our opinion, the careless exposure of elderly patients to cold and drafts during or immediately following operation contributes as much to the production of pneumonia as inhalation anesthesia. Many patients who have had only local anesthesia develop pneumonia, and we believe that in these instances the pneumonia is due to careless exposure in the operating room. We have learned from bitter experience that the patient who catches cold easily while in the hospital is a poor surgical risk. He has little resistance to the ordinary respiratory infections which are found in any hospital. Such a patient should be sent home with a permanent suprapubic catheter

until his resistance is re-established and should be operated only during warm weather.

Postoperative hemorrhage may be prevented by thoroughly infiltrating the prostate with novocaine before enucleation is started. We are in the habit of stitching the bladder mucosa edge following enucleation and tying all visible bleeders. In addition, we use the Pilcher bag to control hemorrhage. The patient is returned to a very warm bed and the administration of fluids by rectum is started at once. If he complains of pain, morphine is given liberally. The tension of the Pilcher bag is released after six hours and again after twelve hours. We use mercurochrome freely in the wound through the catheter and through the drainage tube. If there is no bleeding forty-eight hours after operation, all suprapubic drains, including the Pilcher bag, are removed. A catheter is gently pulled through the urethra to the bladder by means of the urethral tube of the Pilcher bag and is anchored. Gentle irrigation is used and mercurochrome is given through the catheter three times a day. The patient may get out of bed as soon as he wishes.

In our experience, the sloughing, stinking wounds which we used to encounter following suprapubic operations need not occur. We think

that mercurochrome has helped us to control this condition. Constant attention is necessary if the wound is to heal promptly. Catheters are adjusted so that there is little or no suprapubic leakage.

The most distressing complication which may arise following operation is epididymitis. Since we have advised vasotomy and have been particularly careful to control infection with mercurochrome, the number of cases of epididymitis in our series has been small. The intravenous injection of a solution containing 31 grains of sodium iodide has controlled the pain, temperature and swelling accompanying epididymitis within twenty-four hours in practically every instance.

We believe that further reduction in mortality in cases of enlargement of the prostate gland is impossible, unless every patient is carefully studied. The urologist must be able to appraise the physical condition of every patient correctly before operation, or he must have the close cooperation of other physicians who are trained to make a thorough physical survey. Data obtained from a complete physical survey often indicate that a patient who is apparently well has lesions which contraindicate operation.

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THE KIRKPATRICK CONSUMPTION CURE FAKE

One George Kirkpatrick, an obscure veterinarian of Portland, Ore., exploits a quack consumption cure, "Pul-Bro-Tu." The mayor of Portland wrote a letter favorable to the preparation. The city council of Portland decided that a committee should be appointed to investigate the "cure" and the members of this committee were named by the mayor. The committee filed a report declaring unanimously that the Kirkpatrick nostrum was "without value in the treatment of tuberculosis and its use, as such, constitutes a menace." When the mayor testified before the committee, he declared, in effect, that his enthusiasm for Pul-Bro-Tu was based on the eulogistic reports he had received regarding the nostrum from Drs. Ralph C. Walker and Carl T. Ross. The committee brought out that Dr. Walker was a stockholder in the Kirkpatrick Remedies Company, and that both Dr. Walker and Dr. Ross profited through their tie-up with the Kirkpatrick outfit. (Jour. A. M. A., March 31, 1928, p. 1041.)

LUKOSINE NOT ACCEPTABLE FOR N. N. R.—II

Since publication of the report of the Council on Pharmacy and Chemistry on Lukosine the National Drug Co. has informed the Council that the quantitative formula for the preparation is given in its price list and in its "revised advertising." The latter contains the following formula: "Boric acid, 80.5 per cent; Alum, 9.2 per cent; Zinc Sulphate dried, 4.0 per cent; Zinc Phenolsulphate [Phenosulphonate?], 2.5 per cent; Sodium Salicylate, 2.5 per cent; Phenol, 1.0 per cent, rendered pleasantly aromatic with a blend of Thyme, Peppermint, Eucalyptus and Methyl Salicylate. Each heaping teaspoonful contains 1/75 grain of Hydrastine White Alkaloid." In view of this the Council revises its statement by the omission of the word "semisecret" to read: "Lukosine is unacceptable for N. N. R. because it is a needlessly complex, and therefore irrational, mixture, marketed with a therapeutically suggestive name and with unwarranted therapeutic claims, in such a way as to lead to its indiscriminate and ill-advised use by the public." (Jour. A. M. A., August 13, 1927, p. 542.)

THE DIAGNOSIS OF RENAL TUBERCULOSIS*

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THE development of a tubercle is the same in all tissue whether it be in lung, gland, bone, meninges, or kidney. The tubercle is the tissue reaction to the Koch bacillus. Through the ingestion of food infected with the organism or through the inhalation of air laden with it, the bacilli enter the blood stream and wherever a clump settle there immediately follows a necrosis, accompanied by epithelioid and giant cell formation. The fate of the tubercle may be: (1) encapsulated by fibrosing tissue, and thus cure; or (2) the necrosis proceeds to a liquefaction and cavity formation. In pulmonary tuberculosis where cure is relatively frequent and frankly acknowledged, it is due to the fibrosing process and where the patient succumbs it is because the liquefaction has gained the upper hand. Strange to say, the kidneys have not been so kindly treated by nature as the lungs, bones, or joints. The leading authorities such as Rovsing, Wildbolz, Israel, and Joly maintain that spontaneous cure of renal tuberculosis never takes place. Others, especially in recent years, argue to the contrary. Notably experimental work by Medlar, who industriously examined in serial section many kidneys from patients dying of pulmonary tuberculosis, tends to show that healed areas in these organs denote that there had been tuberculous infection present, and that these organs were cured by fibrosis. Thomas appears to have in his fairly large experience clinical evidence to substantiate such contention. They ask pointedly why should a tuberculosis cure be impossible in the kidney when it is absolutely proven in lungs, bones, and glands? The last word has not been spoken in this regard and so far as we can gather the problem resolves itself into this: given an infection with a weak strain of the Koch bacillus in a patient with marked resistance, and so situated that a proper regime for tuberculosis cure can be maintained, in such instance cure is probable; on the other hand where matters have progressed to the stage where there is marked cystitis, pyuria, and Koch bacilli

in the urine, it is likely that surgery offers the only cure.

EFFECT OF AGE AND SEX

It is generally agreed that renal tuberculosis occurs mostly in the third and fourth decade. It is twice as frequent and more chronic in men than in women. Whereas the average lifetime of women with this disease is five and three-fourths years, men live only three and three-fourths



Fig. 1. Tuberculous right kidney with abscess near the tip of upper major calyx.

years. Also the immediate operative mortality is much higher in the male, being, according to some statistics, 9.5 per cent in men and 4 per cent in women.

ASSOCIATED TUBERCULOSIS

It is considered that renal tuberculosis is usually one of several localizations of a tuberculous infection, and statistics show that in patients who suffer renal tuberculosis we can find tuberculosis

*Read before the North Central Branch of the American Urological Association at Madison, Wisconsin, Oct. 15, 1927.



Fig. 2. Same kidney injected with 5 c.c. sodium iodide after extirpation.



Fig. 3. Same kidney injected with 10 c.c. sodium iodide.



Fig. 4. Same kidney injected with 15 c.c. sodium iodide. Note multiple large abscesses in parenchyma.

elsewhere in 71 per cent of cases. Braasch lists 300 cases in which upon careful clinical and roentgenological study 28 per cent were found to have pulmonary tuberculosis. In another series of 346 cases, 6 per cent had bone and 6 per cent gland involvement. Persson states that his material showed 22.4 per cent with pulmonary tuberculosis, 15.6 per cent with genital tuberculosis, and 7.1 per cent with bone and joint tuberculosis.

MANAGEMENT: MEDICAL OR SURGICAL?

The question in tuberculous kidney is whether the case should be handled surgically or medically. A review of the results by men having large experience shows that the cases handled without surgery usually end in disaster. Rafin reports 91 dead and only 77 alive in his series. Of 316 cases Wildbolz reports, 33.3 per cent dead in two years and 58 per cent dead in five years. Pers-



Fig. 5. Tuberculous left kidney. Note dilated calyces and the moth-eaten appearance.



Fig. 6. Tuberculous left kidney. Note dilations of calyces, parenchymal abscesses, and numerous strictures of the ureter due to tuberculous ureteritis.



Fig. 7. Right kidney from same patient, normal.



Fig. 8. Extreme dilatation of ureter with multiple strictures due to tuberculous left kidney.

son shows in his material 84.5 per cent of non-operated cases fatal, 63 per cent in the first year.

On the other hand the cases submitted to surgery have to face first the immediate mortality, then the late mortality, and then persistent tuberculosis in spite of surgery.

Below are figures from some of the large clinics:

The Mayo Clinic lists 863 operative cases showing an immediate operative mortality of 2.7 per cent; Wildbolz, in 445 cases an immediate operative mortality of 2.4 per cent; Crabtree and Cabot 3.8 per cent; Kummer 7 per cent; Legueu and Chevassu 5.9 per cent in 1,539 cases; Boeckels 12.9 per cent in 2,289 cases; Persson 7.3 per cent; Israel 12.9 per cent in 1,623 cases.

The average of immediate operative mortality is 5 per cent; late mortality 15 per cent; patients with tuberculosis after operation 20 per cent; cured 60 per cent.

SYMPTOMS

Bladder irritability is one of the outstanding features of renal tuberculosis. It usually occurs early and is extremely resistant to medication. It is found as an early symptom in 74 per cent of the cases and develops later in an additional 18 per cent, making a total of 92 per cent. It is

evidenced by marked frequency of urination—more marked during the day than at night, and there is burning on urination with much pain. Blood frequently shows in the urine, 5 per cent of cases having gross hematuria and 68 per cent showing microscopic blood. Pyuria is encountered so often that it may be considered constant. With this pyuria a sterile urine is found



Fig. 9. Same case. Extirpated kidney injected with sodium iodide.



Fig. 10. Extreme dilatation of pelvis and ureter due to multiple tuberculous strictures of ureter. Right side.



Fig. 11. Dilatation of ureter and pelvis probably not tuberculous.

and it is of general knowledge that marked pyuria with sterile urine indicates tuberculosis. Smears are positive in 78 per cent of all cases and guinea pig inoculations give an additional 7 per cent positive, making a total of 85 per cent.

A note or two on animal inoculation may be opportune. The test is extremely delicate and highly valuable. When urinary sediment is injected intraperitoneally or subcutaneously into a guinea pig the animal will develop tuberculosis. Lowenstein has shown this interesting experiment. He injected Koch bacilli into the foot of a guinea pig and an hour later amputated the foot. Nevertheless the animal developed tuberculosis. The question may well be raised whether this test is 100 per cent dependable. The answer is no. Braasch reports that out of forty-five kidneys which were proven tuberculous after extirpation, five, or 11 per cent, were negative to guinea pig inoculation. Furthermore, of his material which showed positive smear, 6 per cent were negative to guinea pig inoculation. To explain this contradictory evidence it is said that the inoculations may have been done at a time when the urine was free from the organism, or that there occurred promptly a fibrosis and encapsulation about the lesions, or that the animal had a singular immunity to the germ, or still

further that the organism may have been the avian type, in which case parrots rather than guinea pigs should be used. Whatever the cause, it remains true that 10 per cent of inoculations may be falsely negative.

CYSTOSCOPY

Cystoscopy is of extreme value in renal tuberculosis. The existent pathology in the bladder makes it extremely sensitive, at times necessitating caudal anesthesia. Inspection of the interior of the bladder reveals a mucosa highly injected, probably bleeding, markedly edematous, and covered in places with an overgrowth of mucosa presenting polypoid masses, not unlike papillomata. Usually one meatus shows this picture whereas the opposite is relatively normal. The bladder capacity is markedly reduced. Tubercles, and ulcerations may be encountered and the bladder urine will of course yield the Koch bacillus.

PYELOGRAPHY

Renal tuberculosis can be for the main part diagnosed without pyelography. However, circumstances may be such that it is the only thing that will establish the diagnosis. Smears and animal inoculations may be negative, due to the patient being for the time free from Koch bacilli

showers; or the kidney may be a closed organ following complete occlusion of the ureter by stricture. So that in a certain percentage of cases pyelograms are necessary, and it may be added they are of extreme help. In the first place dilatation of pelvis and calyces is to be looked for. The change occurs first in the tips of the calyces, giving them a rounded and moth-eaten appearance. The degree of dilatation depends on the extent of the involvement of the pelvis and calyces. Should the disease become established in the parenchyma, abscesses will be found there, single or multiple, and of all sizes. Sooner or later each abscess gains entrance into a calyx and filling the pelvis brings out these cortical abscesses in a characteristic manner. Furthermore, as the tuberculous material passes down to the bladder, bacilli lodge in the wall of the ureter with a resulting tuberculous ureteritis and subsequent stricture formation. The strictures may be single or multiple and will of course show in the pyelogram as areas of constriction and dilatation.

AUTONEPHRECTOMY

Tuberculosis involving a kidney progresses to caseation and formation of a cavity which sooner or later finds an exit into the pelvis. This tuberculous material frequently sets up a tuberculous process in the walls of the ureter with ulcer and stricture formation. Thus the ureter becomes narrowed and at times complete occlusion results. Following this there is of course a cessation of infection reaching the bladder from the kidney above and the bladder may truly completely cure itself of its cystitis, with the disappearance of the frequency and the burning, the pyuria and bacilluria. In fact, many cases of this type have been advanced as spontaneous cure of tuberculous kidney as an argument against surgical intervention. In other words, closed kidneys have been exhibited as cured kidneys. That a closed kidney is not a cured kidney is well shown by the work of Braasch, who injected into guinea pigs emulsions from five such kidneys and found that one animal developed tuberculosis. What really happens after the closure of the ureter is that the caseation and liquefaction in the kidney continues until the entire organ is destroyed, leaving above the occlusion a dilated ureter full of pus with a huge sac of cheesy material in place of the kidney. This

remains ever as a liability to the patient in that it may infect with tuberculosis the good remaining kidney, or a perinephritic abscess may follow on the diseased side, to say nothing of the untoward effects of toxin absorption. It follows therefore that in autonephrectomy we are dealing with a closed kidney rather than a cured kidney and removal is the treatment of choice.



Fig. 12. Complete occlusion of ureter at the lower border of the sacrum following tuberculous ureteritis with multiple kidney abscesses.

CONCLUSIONS

1. Tuberculosis of the kidney is a blood-borne infection following ingestion of food contaminated with the Koch bacillus or following the inhalation of air laden with tuberculosis germs.
2. Medical cure may possibly occur in favorable circumstances but the majority of cases require nephrectomy.
3. The disease occurs for the most part in the third and fourth decade. Men are twice as often affected as women and the mortality in the male is much higher, due, no doubt, to the involvement of the genitalia in the male.

4. Although guinea pig inoculation may be falsely negative in 10 per cent of cases, the test is extremely valuable.

5. Cystoscopy shows a typical picture of congestion, edema, ulceration, and tubercle formation.

6. Smear 78 per cent and guinea pigs 7 per cent.

7. Autonephrectomy is a closed, but not cured, kidney. Danger from a perinephritic abscess and infection of the healthy kidney, as well

as toxin absorption, indicates the advisability of surgical removal.

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PROPRIETARY PREPARATIONS AND PROPRIETARY NAMES

The rule of the Council on Pharmacy and Chemistry of the American Medical Association provides that, when a proprietary substance is admitted to the U. S. Pharmacopeia, it will be retained in New and Non-official Remedies only if the official name is given prominence on the labels and in the advertising. The justice of this rule concerning proprietary names cannot be questioned. It is in the interest of scientific medicine and medical progress. The history of Argyrol, which the Council has been obliged to omit from New and Non-official Remedies for conflict with this rule, is another example of the manner in which clinical evidence, none too carefully obtained, may boost a new remedy into popularity beyond its due. The promoter of a proprietary preparation, riding on the crest of a wave of popularity, is seldom willing to come down to the level of the quiet sea when the storm subsides. The Council has examined calmly and dispassionately the therapeutic claims made for Argyrol and has been unable to find evidence for some claims which it terms essentially misleading. Furthermore, the manufacturer is apparently unwilling to adopt the pharmacopeial synonym for it. The insistence on this synonym is important that physicians may fully comprehend the nature of the substance that they are using. The first duty of any one working in the field of medicine, be it investigator, teacher, physician or manufacturer, is to the public that is being served. This policy has been fundamental in compelling the omission of Argyrol. (*Jour. A. M. A.*, March 17, 1928, p. 855.)

ABRAMSISM ABROAD

The fantastic hokum of Albert Abrams is practically a dead issue in the United States. It has been relegated in this country to obvious fakers, some osteopaths, and the occasional physician who suffers from an itching palm or a lack of scientific balance. The Abrams fantastic hokum is now deluding the credulous in England, Canada and France. In Canada it has no support from the more responsible element of the medical profession. In France, the Abrams nonsense seems to be mainly boosted by one Régnauld. It is in England, however, that the E. R. A. has taken on its most amusing, or, should we say, its most tragic aspect. The chief exponent of the Abrams cult in the British Isles is Sir James Barr, who was once president of the British Medical Association. Sir James seems to have swallowed Abrams' theories hook, line and sinker. (*Jour. A. M. A.*, February 4, 1928, p. 401.)

EPINEPHRINE AND EPHEDRINE IN RELATION TO BLOOD PRESSURE

The action of ephedrine on the circulation is different from that of epinephrine. While the latter is a powerful heart stimulant, ephedrine is a direct depressant to the heart. A heart that has been depressed by continued low blood pressure is so sensitive to the depressant action of ephedrine that the poor condition of the circulation may be aggravated by it. It is also much feebler as a vasoconstrictor than is epinephrine. Hence, as a circulatory stimulant, ephedrine has been a disappointment. (*Jour. A. M. A.*, March 10, 1928, p. 791.)

CARCINOMA OF THE COLON*

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BEING aware of the fact that from very limited material not much can be added to our present knowledge of the vast subject of cancer of the colon, I have consulted modern literature and have compared facts as they were represented in my cases.

Statistics tell us that most of such cancer appears in the ages between forty and sixty; however, we must realize that cancer of the colon exists in very young people, in the ages between twenty and thirty, and even earlier.

Public talks on cancer have educated the people of the present age as to cancer of various forms. So patients now come to medical men with these problems a great deal earlier than they did in the past. This progress has led to marked improvements in surgical results. Nevertheless it is doubtful if the laity can aid us in the early diagnosis of intestinal cancer.

What are the main symptoms that lead us to make a diagnosis of colon cancer? Obviously a case of intestinal obstruction must suggest to us the diagnosis of possible cancer. We should succeed, however, in making a diagnosis of a case of intestinal cancer previous to the state of obstruction, because this latter condition is not only much dreaded, but the operability of the obstructive tumor has at this stage become questionable. It is, therefore, to the early symptoms that we will have to give more significance, more importance.

A careful history must be taken. In the early stage of the disease the bowel shows a condition of irritation, marked by irregular movements, constipation at times alternating with diarrhea. If this condition becomes worse, a distinct abdominal discomfort becomes apparent. The question of bowel movements, as to diarrhea and constipation, must be elicited by the questioning physician. Intense questioning often brings out the fact that the stool has become gradually more constipated. No pain is mentioned as yet by the patient, but the movements are not giving complete satisfaction. The pa-

tient goes to stool repeatedly; he suffers from tenesmus of the bowels. (Anschuetz has reported a case of tenesmus of the bladder in colon cancer.) This condition leads to the symptoms of intestinal obstruction with its characteristic colicky pains.

Pain in the abdomen is often located in the right lower quadrant and not infrequently the picture of appendicitis is camouflaging the true ailment, as in one of our own cases. It is rather exceptional that the patient will locate the pain directly at the place of obstruction. It has been brought out years ago that pain caused by obstruction in the large intestine is below the horizontal navel line.

Loss of body weight is also to be taken into consideration together with other symptoms, but this is often not very marked. The picture of cachexia is not an early one in cancer of the colon, as it is, for instance, in cancer of the stomach.

Furthermore the history may bring out the fact that patient lost blood with the stool.

Alarmed by the facts brought out in the history we go over the patient and find, for instance, that his temperature is somewhat elevated, a condition which he never was aware of.

The abdomen is then percussed and palpated for the presence of a possible tumor, the one thing we have to look for. If this tumor is located in the hepatic or splenic flexure or in the sigmoid, the findings are practically always negative. Much depends upon the abdominal wall; if this is held rigidly then the tumor remains undiscovered wherever it is located, and the same can be said in an obese individual. Otherwise, such conditions excluded, a tumor in the cecum, transverse colon and even descending colon can ordinarily be discovered. It is most important that we make thorough palpatory examination with the patient in different positions. Even then a large tumor can at times be missed, as we found in a case involving the transverse colon, to be described later on. This latter phenomenon is probably best explained in our case by overlying and filled small intestinal loops.

*Read before the annual meeting of the Western Surgical Association, Omaha, Nebraska, Dec. 8 and 9, 1927.

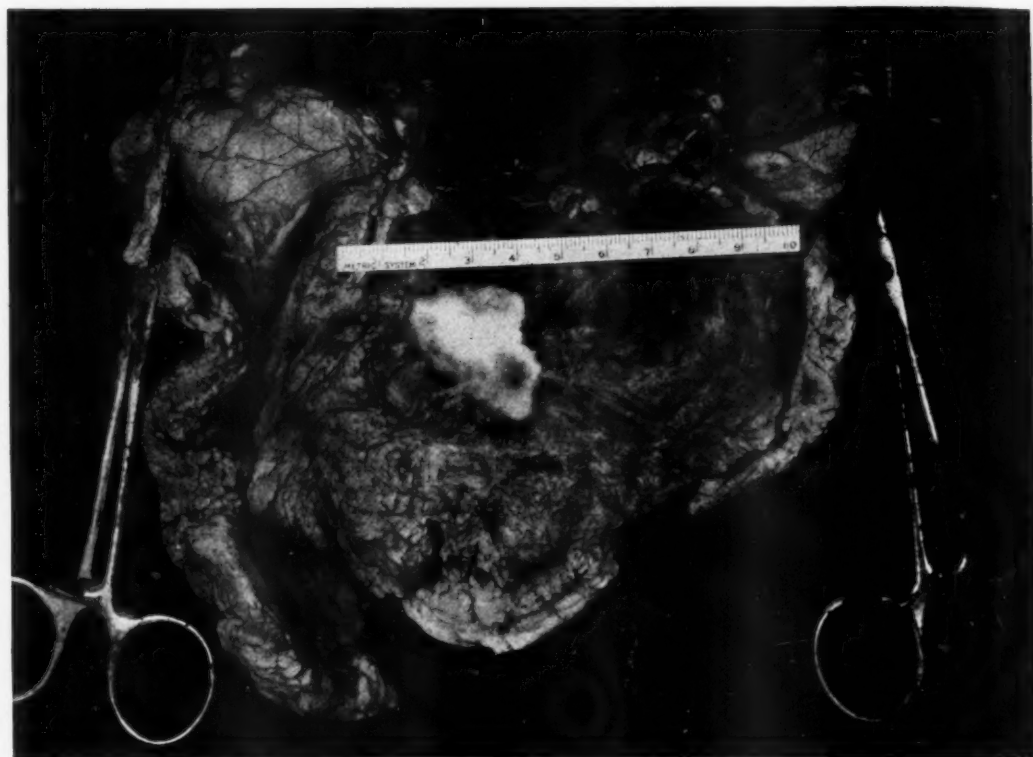


Fig. 1. Adenocarcinoma of the transverse colon (anterior view).

Not only is a digital examination of the rectum essential, but proctoscopy must be added, if the tumor is not otherwise detected. Moreover the microscopy of the stool is to be done for blood, pus and mucus. The benzidine test must be repeatedly done if first negative. It is only in very exceptional cases that we discover cancerous tissue in the stool.

A patient with colon cancer most often presents a marked anemia. It is characteristic that the proximal half of the colon, if affected by cancer, brings on pronounced anemia in contrast to that produced by cancer of the transverse, descending, and pelvic colon. I refer to an interesting article from the Rochester Clinic on such secondary anemia from cancer of the colon. It was brought out there that on account of the greater size of the cecum and the ascending colon, the tumor is here more extensive without causing symptoms of obstruction, and the larger tumors offer more surface for ulceration and consequent bleeding. When this ulceration is prevented by short-circuiting of the bowel with-

out resection of the tumor, the anemia improves markedly, at times vanishes entirely.

The final step in the search for colon cancer ought to be the examination by roentgen rays. It often makes a diagnosis or completes a diagnosis. But, should the first result be a negative one, have the examination repeated and insist upon the roentgenologist making the examination with a barium enema. In acute obstruction a barium meal is ill-advised. It may be allowed in cases of partial obstruction, and it always must be done where there is no obstruction.

We can only briefly refer to the differential diagnosis, excluding other diseases as tuberculosis, actinomycosis, hyperplastic conditions of the intestines, colitis of the various kinds, and especially diverticulitis. An illustration of an erroneous diagnosis is the following case:

A thirty-six year old housewife complained of pains in the stomach radiating toward the right lower side of abdomen, with flatulence but no vomiting or nausea. The heavy-set woman had some fever, an increased leukocyte count with 78 per cent hemoglobin. In the right side of abdomen above McBurney's point there

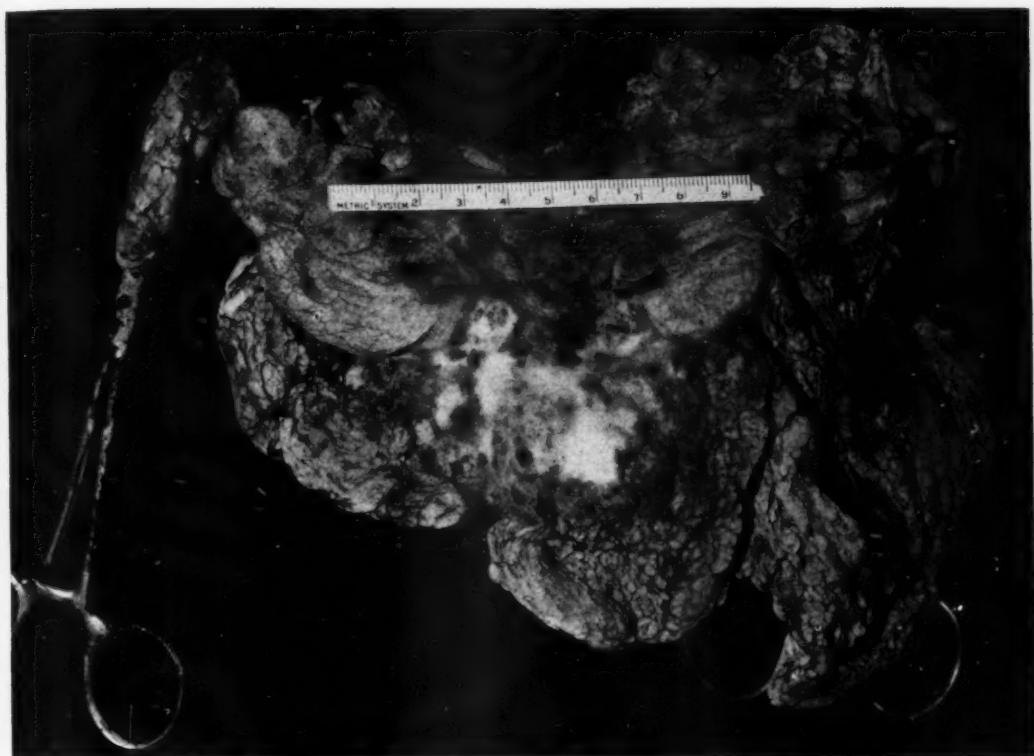


Fig. 2. Adenocarcinoma of the transverse colon (posterior view).

was a painful immovable resistance, the size of a child's palm. The x-ray examination was negative.

At operation we came onto a mass covered with omentum and adherent to some small intestinal loops. The tumor, not nodular, but hard, of the size of a small fist, was a part of the sigmoid. It was treated after Mikulicz with eventration and fixation to the abdominal wall, and a colostomy of the descending colon was added in the lumbar region without opening the gut then or later, as no symptoms of obstruction developed. After five days the tumor was removed with a cautery and as the posterior serosa suture was laid previously to the excision of the tumor the closure of the gut was very easily accomplished under local anesthesia in one session six months after removal of the tumor.

The specimen removed was 18 cm. long and proved to be (report of the pathologist) chronic ulcerative colitis. As far as we know the patient is living and well.

As surgery is the only treatment for cancer of the colon we may be permitted to bring out a few points of interest. The greatest step ahead in surgery of the colon has been done by Mikulicz who in the early nineties recommended eventration of the tumor and draining of the gut, thereby

reducing the formerly exceedingly high mortality. Today the results of resection of the colon for cancer still vary considerably, mostly on account of the condition of the patient, but also depending on the surgeon who handles the case.

I would like to quote from Moynihan's "Abdominal Surgery" the largest statistics by Okinzyk (*Cancer de l'intestine Paris, 1923*), a series of 1,404 cases, excluding the rectum, where the cancers were equally distributed; a little over 40 per cent on the left side and the same on the right side, while in only 19 per cent was the transverse colon affected.

Irrespective of the location of the growth in the colon, an acute obstruction demands a colostomy or a cecostomy. An excision of the cancer is then done subsequently. In cases of the cecum involving the ascending colon or the hepatic flexure we remove the whole ascending colon and at least one-third of the transverse colon. The ileum is anastomosed with the transverse colon. I refer to the beautiful illustration of this operation by C. H. Mayo and W. H. Hendricks in

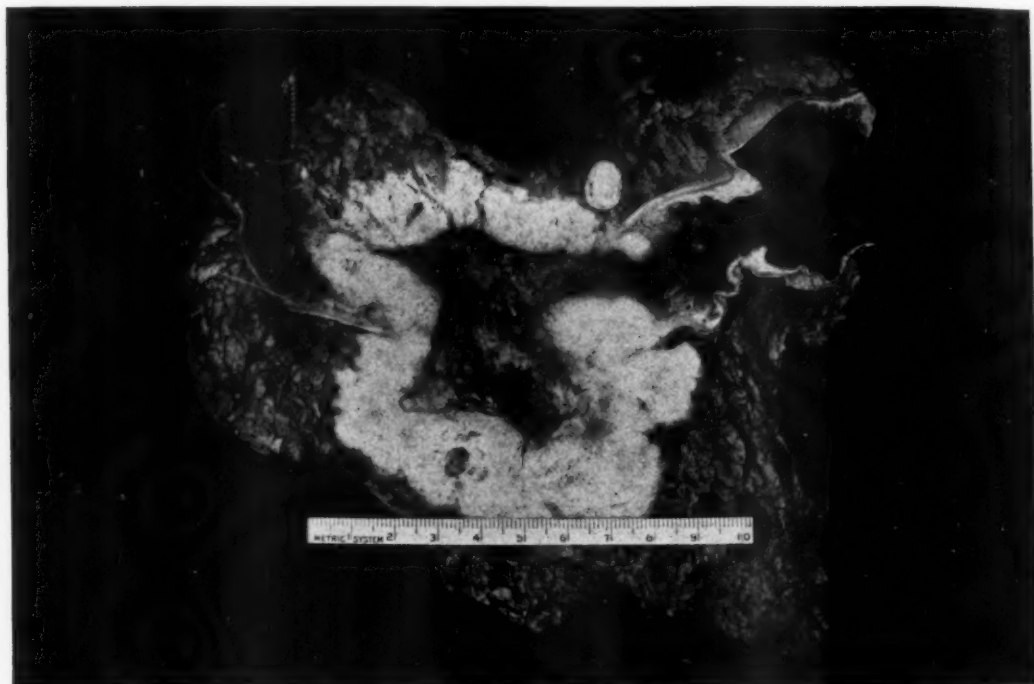


Fig. 3. Adenocarcinoma of the transverse colon (sagittal section).

the Annals of Surgery of March, 1926, where they show that a Murphy button can be used for the anastomosis and where the end of the transverse colon is brought into the wound and fastened there as a "safety valve."

Just as Kocher has shown us in the operation for resection of the stomach how to mobilize the duodenum, so has Moynihan taught us how to mobilize the large gut including the hepatic and splenic flexure; he has shown us that it is not as difficult to do as it might appear *prima vista*. "When carried out thoroughly," Moynihan states, "it results in the colon having as great freedom of movement as the small intestine."

A great deal has been written about end-to-end, end-to-side, and side-to-side anastomosis, but the men who have done the most in that line agree that it is not very important which method is followed.

The fact is sometimes forgotten that the wall of the colon is thinner than the wall of the small intestine. If obstruction exists, the wall of the distended gut is still thinner. It is easy, therefore, for the bacteria to find their way through. Knowing also that the colon is a regular hot-bed

for bacteria, the most exact asepsis is required in surgery here. Kocher already has drawn our attention to the fact that infection has been carried by the suturing material coming from within the gut toward the serosa, inviting peritonitis. Personally I know that Kocher never used any other suturing material for the gut than silk. This strongly convinces us that unabsorbable material like silk and linen should not be used in form of a continuous suture on the large gut.

Of cancer of the transverse colon Moynihan says: "The growth is as a rule small, and the glandular involvement limited to those lymphatic glands which lie upon or alongside of the bowel. For these reasons the resection need only be limited; a fair length can be removed, and an anastomosis made without tension."

We recently operated on a cancer of the transverse colon and I think it is of interest to report the case *in extenso*.

A thirty year old girl doing clerical work consulted us the first time in January, 1927, complaining of pains in the right lower quadrant of the abdomen and of recent constipation. She never was nauseated nor vomited. She never observed any blood in the stool. The patient looked pale and her hemoglobin was below

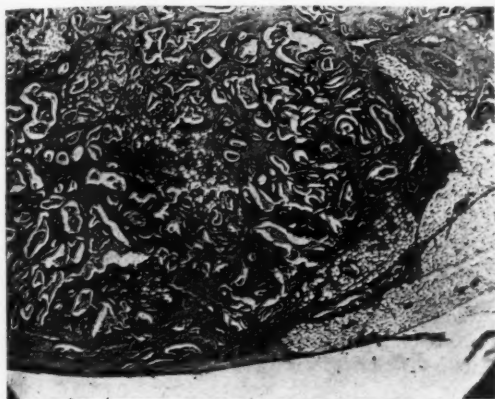


Fig. 4. Adenocarcinoma of the transverse colon (microscopical section—low power).



Fig. 5. Adenocarcinoma of the transverse colon (microscopical section—high power).

fifty per cent. The gastrointestinal examination by x-ray revealed a retrocecal appendix. This was removed and the patient soon returned to work feeling much better, stating later on that the pain in her abdomen had left her and that the bowels were moving regularly within the next three months.

In August, seven months after the appendectomy, she came to my office during my absence to see my associates. They, at that time, found a distinct mass around the navel, above and below it, well demarcated and movable, not painful to touch and with a smooth surface. As the patient did not know of any blood in her stool and as there was no colicky pain the doctors thought of a possible foreign body. No further operation was done until I returned in October, when the patient entered the hospital.

She looked very pale. Her hemoglobin was down to 38 per cent. She then stated that she had observed blood in the stool twice of late. At one time clear blood preceded the stool, but she never had any pain, never vomited nor felt nauseated. But she complained of a general malaise.

Perussion and palpation brought out a well demarcated tumor with irregular form, irregular hard edges, and a smooth surface, located directly in the region of the navel, more above but equally to the right and to the left, a tumor of the size of the palm of a large hand, movable in all directions, slightly sensitive to touch. Surgery was proposed. We excluded the possibility of a foreign body on account of the blood in the stool and made a diagnosis of malignancy, possibly a tumor of the omentum. The striking feature of this tumor was that at times it could not be detected by any of us while usually it was very large and very plain to the palpating hand.

A repeated gastrointestinal x-ray examination showed now a marked defect in the transverse colon and enabled us to definitely make the diagnosis of a malignant tumor of the transverse colon.

On October 11, 1927, we gave the patient 600 c.c. of citrated blood, which brought the hemoglobin up from

38 to 44 per cent. The patient was properly prepared. We incised the abdomen in the mid-line over the tumor and found the same free from adhesions, belonging to the transverse colon and being of unusual size. It was very movable, thus easily everted. It comprised the larger part of the transverse colon, equally to the right and to the left. We practically shaved off the tumor and the large omentum from the larger curvature of the stomach and with it we removed two enlarged glands situated in the ligamentum gastro-colicum. Then making certain that the suturing of the gut after removal of the tumor could be done without tension, we loosened the hepatic and splenic flexure manually a bit. The proximal and distal end of the colon, 10 to 11 centimeters away from the tumor, was then divided with cautery between the clamps and the tumor removed, and end-to-end anastomosis established. Two continuous catgut sutures united the lumina and four posterior and as many anterior interrupted linen sutures, about 1.75 cm. from the suture line, were added, thus avoiding tension on the first suture line.

The pathologist reported: "The tumor mass involving the transverse colon and the omentum is 10.5 cm. by 9 cm. and 6 cm. deep. It has anteriorly a smooth surface which is partially light colored and has a white pearly appearance. The tumor was sectioned sagittally and showed a roughly irregular cavity extending down from the lumen of the bowel from 3 to 3.5 cm. in width. The lumen of the bowel crosses the tumor transversely at the upper border. The normal mucosa has totally disappeared, the whole lumen being of the same type as the tumor cavity itself. The tumor cavity proper ends abruptly at the edge of the hard wall and a fairly normal mucosa lines the gut on either side. The tumor wall is from 2 to 4 cm. thick, is extremely hard, light in color, with a small amount of yellowish areas, grossly suggesting fat.

"The microscopic section taken from the lower posterior wall of the tumor shows a more degenerated fibrous stroma with some fat cells. Roughly cylindrical epithelial cells infiltrate irregularly everywhere the stro-

ma and have a marked tendency toward gland formation. At some points this attempted gland formation is very distinct, so that there is even secretion in the lumen; at other points it is not quite so complete. There are mitotic figures. At one side of the tissue there are numerous blood vessels and blood sinuses. One sinus has a partly purulent thrombus. The round cell infiltration is especially marked at this point.

"Diagnosis: adenocarcinoma."

The recovery of the patient was unusually undisturbed. She never vomited after the operation and had very little discomfort. Her abdomen remained flat and soft, and did not show the slightest degree of peritoneal irritation. For three days she received an abundant amount of saline solution under the skin and once glucose intravenously. Liquid nourishments were started and well tolerated four days after the operation. The wound healed by primary intention and the patient left the hospital in two weeks. When we saw her on November 14th her hemoglobin was 84 per cent and by December 1st she had gained twelve pounds.

The case is of special interest because:

1. The condition was camouflaged by a retrocecal appendicitis.
2. The symptoms of tenesmus and pains of all kinds were lacking.
3. The patient was a young person of only thirty years.
4. At times the tumor was not detectable by palpation in spite of its unusual size.
5. In spite of there being a large tumor, there were no adhesions to the parietal peritoneum or other viscera.

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DRUGS APPLIED THROUGH THE SKIN

Certain drugs are absorbed by the skin, others not. Non-volatile substances are not absorbed from aqueous solution. Such substances can be absorbed when applied to the skin in a fatty medium and with considerable friction. Bodies soluble in fat or fat solvents penetrate the skin more readily than water soluble substances. There is not great absorption, however, unless the substance is volatile. Volatile substances are much more readily absorbed through the skin and the degree of their absorbability is probably proportional to their volatility. (*Jour. A. M. A.*, February 11, 1928, p. 481.)

RELATIVE SAFETY OF SEDATIVE DRUGS

Sulphonmethane (sulphonol) and sulphonethylmethane (trional) have to a large extent been superseded by phenobarbital (luminal) and barbital (veronal), especially because the sulphonmethanes are apt to make the patient drowsy the day after the ingestion, and are liable to produce an alteration in the blood which manifests itself by hematuria and hematuria. Barbital is a relatively safe but feeble hypnotic which may be preferred to all others when a mild effect suffices. Phenobarbital is a much more potent drug. It is safe when given in a dose of from 0.1 to 0.2 Gm. It is contraindicated in the presence of marked asthenia and in nephritis. (*Jour. A. M. A.*, March 10, 1928, p. 792.)

OTITIC THROMBOPHLEBITIS*

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OTITIC thrombophlebitis is usually caused by the hemolytic streptococcus: percentages in reported cases vary from seventy to one hundred.^{1,2,3,4,5,6} Other organisms, such as the non-hemolytic streptococcus and staphylococcus albus, are occasionally found in the blood, but the hemolytic streptococcus predominates. Little is gained by bacteriological study of aural discharge on account of inevitable contamination; however, hemolytic streptococcus predominates here also. To be of value, cultures must be made at paracentesis; frequently this is impossible. The hemolytic streptococcus predominates in mastoid cultures, which are of value because they more closely represent the organism responsible for aural complications. Of sixty consecutive mastoidectomies I took such cultures in forty-one. Thirty-six and five-tenths per cent showed the hemolytic streptococcus, 9.75 per cent showed a non-hemolytic organism, 7.3 per cent showed the staphylococcus, 2.4 per cent showed the hemolytic streptococcus combined with the staphylococcus, 9.75 per cent an unclassified streptococcus, and 34.1 per cent were sterile.

Consideration of thrombophlebitis is simplified by remembering that three factors are involved: phlebitis, thrombosis, and septicemia, and that their development is influenced by certain anatomical facts. The position of the sinus with reference to the mastoid antrum has some bearing.^{7,8,9} The mastoid process of a brachycephalic skull tends to be small, diploetic with thick cortex and superficial sinus far forward, protected by a thick sinus plate and separated from the antrum by a thin layer of bone. The sinus is near the antrum and is easily involved, either by contiguity or by thrombophlebitis of tributary veins, which often develops in this type of mastoid.^{2,3,4} A dolichocephalic skull is apt to have a large, pneumatic mastoid with thin cortex, a sinus far back and deep, covered by a thin plate and separated from the antrum by a thick layer of bone. Such a mastoid is prone to de-

velop the coalescing type of disease, with perisinous abscess, but the situation of the sinus is a factor of safety.^{5,6,7,8,9}

Infection may reach the interior of the sinus in different ways.^{10,11,12,13} It may spread by contiguity from the mastoid cells, destroying the sinus plate, forming a perisinous abscess, attacking the dura, proceeding through the wall, and finally involving the intima, causing erosion and consequent thrombophlebitis by changes in blood chemistry and rate of circulation. Secondary lesions are uncommon and recovery is the usual outcome. Thrombophlebitis may also originate in smaller tributaries of the sigmoid, such as veins of the mastoid, the internal auditory vein, or lymph channels of the labyrinth, and progress until the great vessel is involved.¹⁴ The blood stream and thrombus are infected from the beginning, the sinus wall secondarily, and metastases are early and serious.¹⁵ Such cases are seen in patients presenting no external sign of mastoiditis and at operation a macroscopically normal wall.

Present surgical treatment of sinus thrombosis is the result of long continued trial, beginning with simple evacuation of the clot and including ultimately some type of obliterating operation on the vein. The position of this latter procedure in otology is settled, but the exact method of its accomplishment is an open question. There is still division of opinion as to the relative merits of ligation and excision. Consideration of this problem must take into account the duration of the disease, the pathology present, and the clinical condition of the patient.

In early cases the pathology has not advanced to the degree found in cases of long standing.¹⁶ There may be a phlebitis of the sinus wall, or phlebitis and thrombosis which has not progressed far towards disintegration and contamination of the blood stream. The jugular may appear normal; if so, ligation meets the surgical indication. In a case seen late, the pathological process has advanced, phlebitis is more marked, the thrombus may have progressed toward disintegration and contamination of the blood stream,

*Thesis presented before the Minnesota Academy of Medicine, Jan. 11, 1928.

and the jugular may be involved. The chances of metastasis are increased.¹⁷ Otolologists are divided in their judgment as to the treatment of such conditions. Many advocate ligation in all cases and there is reported a series of two hundred from the Massachusetts Eye and Ear Infirmary in which ligation alone was performed.¹⁸ The advocates of this method point out that the operation is a quick procedure, produces less shock, does not open the neck to infection to any appreciable degree, leaves less scar, and produces just as good results as excision. It closes the largest venous avenue to the right heart and so permits safe operative interference on the sinus.^{19,20,21,22,23} The Boston School of otologists ligates practically all cases of thrombophlebitis because the results equal those obtained by the more radical procedure.²⁴

Against ligation certain arguments may be advanced. It does not block all the venous pathways to the right heart, and metastasis is theoretically possible, even after its performance.²⁵ Macewen²⁷ criticized ligation on these grounds and because it may cause reversal of current through the collateral circulation. Allport²⁸ made the statement that ligation was known to cause optic neuritis, edema of the brain, cerebral hemorrhage, and thrombosis of the other sinuses. Such cases are rarely reported in the literature. Practically all arguments against ligation are really arguments against jugular procedure of any sort, and apply equally well to excision.

Otolologists who advise excision do so on the ground that the phlebitis always extends for a considerable distance below the thrombus and can not be delimited from the macroscopic appearance of the vein.^{29,30} If this is true, excision must be from a point low in the neck to a point as high as possible, tying all tributaries and removing the vein in toto. The objections to this procedure are several.³¹ The operation is more extensive, is productive of more shock, opens the neck to infection, leaves a bad scar, and often is not warranted.

Jugular intervention involves the question as to whether the sinus or the vein shall be attacked first. If the sinus is done first, infected particles from a disintegrating clot may enter the blood stream. If the jugular is ligated, with only partial obstruction above, it is theoretically possible for a reversal of collateral circulation to

occur.³² This has but rarely been reported. Politzer³³ taught that the vein should be obliterated first, and Kerrisen,³⁴ in his latest textbook, states that it makes very little practical difference unless the patient is extremely septic, in which case ligation should be done first. This appears entirely logical.

The exact point of ligation is of interest. As stated previously, phlebitis always extends below the obvious involvement. In a series of two hundred cases in the Massachusetts Eye and Ear Infirmary only twice was ligation below the common facial vein necessary on account of thrombosis below that structure. Theoretically, in any case in which the jugular seems macroscopically normal the occlusion should be made above the common facial in order to prevent reversal of current through that structure and contamination of adjoining venous channels. Here again opinion is not unanimous and the statement has been made upon good authority^{35,36} that ligation below the common facial is quite as effective; certainly it is simpler from a technical point of view. Personally, I prefer ligation above the entrance of the common facial vein, although it requires a little longer time.

If one studies statistics of results of these two procedures one is surprised to find but little difference. Koerner³⁷ reported 308 cases of sinus thrombosis treated by various methods. Cases treated by combined operation upon sinus and vein showed a mortality of 41.4 per cent and those treated without jugular surgery showed a mortality of 41.7. Jones,³⁸ in 1919, quoted fifty cases, thirty-five having the combined operation and showing a mortality of 14.3 per cent, and fifteen having no jugular surgery and showing a mortality of 13.3 per cent. It is hard to explain the equality of these figures unless it is due to the fact that the cases were treated upon widely varying indications. Crockett³⁹ reported a series of sixty cases of ligation showing a mortality of 16 per cent. Walker,⁴⁰ in 1921, reported a series of eighty-three uncomplicated cases of ligation with a mortality of 19 per cent, and Dench⁴¹ in the same year reported a series of sixty-six cases of excision with a mortality of 28 per cent. These later figures probably more nearly represent the present results of these procedures. The more favorable figures for ligation may be due to early intervention by the men who practice that procedure; also possibly to

the fact that some cases were ligated which were not really cases of thrombosis.

I wish to present briefly the charts of four cases of otitic sepsis because they illustrate some of the problems presented by this disease.

The first case is that of a seven year old girl, upon whom I operated in another city, and whom I was not able to follow as closely as I should have liked. This case was probably complicated before the primary mastoid operation, this being indicated by a temperature of 103.5. The mastoidectomy was done May 9, and the first chill occurred May 12. Surgery was delayed awaiting the result of blood cultures. This was a mistake. At the combined operation May 15 the sinus, completely broken down and full of yellow pus, was opened, the wall was excised, and the lumen packed off. The jugular seemed normal at ligation. The patient ran a long, septic course due to a pulmonary complication caused by metastasis which probably occurred before ligation. Recovery was ultimately complete. This case of abscess of the sigmoid sinus, cured by the sinus operation, plus ligation, illustrates three points: the indication of intra-cranial complication based on high pre-operative temperature, the danger of waiting for blood culture reports when clinical signs of sepsis are fairly clear, and the added gravity of the prognosis after metastasis has occurred.

The second case is that of an eighteen year old girl, who probably had her complication, indicated by a temperature of 103.4 and severe headache, before the primary operation. At operation the plate over the sinus was found softened and adherent, and was removed, but the sigmoid did not present sufficient pathology to warrant its opening. The course of the disease not being controlled, exploratory exposure of the dura of the middle fossa was done four days later. The sinus wall was thick, elastic, and covered with an organized exudate. Six days after the primary operation, blood culture was reported positive for hemolytic streptococcus and ligation was done on an apparently normal vein. The sinus was incised and its lumen packed off, but the wall was not removed. The sepsis was promptly controlled. Just what pathology was present in this case was difficult to determine because the interior of the sinus was not well seen. It might have been a mural clot, a thrombosis of the jugular bulb, or simply a suppurative phlebitis of the sigmoid. This case is of interest because it illustrates again the gravity of high pre-operative temperature, the doubtful value of waiting for blood culture reports in the presence of definite signs of sepsis, and because it shows the prompt subsidence of sepsis after ligation.

The third case is a four year old girl with a chronic suppurative otitis media. Simple mastoidectomy was first done at which the sinus was not exposed. Sepsis developed during the post-operative course and a radical mastoidectomy was done at which the sinus was exposed and found apparently normal. Sepsis continued. The vein was finally ligated; the sinus was not opened. Sepsis promptly subsided and complete recovery ensued. The wisdom of ligating the vein without at the

same time obliterating the sinus is challenged by good authority⁴² but this case did nicely. Here again the pathological process could not be definitely established. The sinus and vein appeared normal and blood cultures were negative. All we can say is that it was a case of otitic sepsis which was controlled by ligation. The sepsis may have been due to phlebitis, thrombosis, or thrombophlebitis of the sigmoid or its tributaries, the jugular bulb, or the jugular vein.

The last case is a chronic, suppurative otitis media in a twelve year old girl. The patient was not seen until late in the course of the disease; marked sepsis had been present for a number of days. There was choked disc of about 4 diopters and meningismus. Radical mastoidectomy was first done. The walls of the sinus were thick, gray and covered with granulation; the jugular vein showed marked phlebitis. The vein was ligated but the sinus was not opened because the operation could not be prolonged. The sepsis was not controlled and at the second operation the vein was removed and the sinus wall resected. Sepsis continued and at the third operation one-half inch of septic vein, all that could be reached, was taken out. The remaining stump presented marked phlebitis and contained a purulent thrombus. It was not anticipated that this procedure would benefit the patient but we were surprised at the prompt subsidence of sepsis and the rapidity of convalescence. Early blood cultures were negative, but late in the course of the disease a staphylococcus albus was recovered, probably a contamination.

This case, then, was one of abscess of the sigmoid sinus and jugular vein which required excision of the vein. It contains several points of interest. Advanced disease was found in a case seen late in its course and the surgery was more radical. Cultures were negative in spite of an advanced pathological process. A septic focus was taken care of by a child much debilitated by two weeks of sepsis, a fact which might be advanced in favor of ligation in such cases.

The position of jugular surgery in sigmoid sinus thrombophlebitis is established beyond question and the consensus of opinion is that it should be done first. The question which is still open is that of ligation versus excision. There are two schools of thought about this problem. One, exemplified notably by the men in Boston, maintains that simple ligation should be done very early, is sufficient for practically every case of thrombophlebitis, and presents great advantages over excision. The critics of this position hold that ligation is done too early and upon insufficient indication, thus obtaining figures which are too high for the real value of the procedure. An equally large and authoritative school uses ligation only in very early cases, when the diag-

nosis is doubtful, when the blood culture is negative, or when the patient is too septic to permit prolonged procedure. These men adopt excision for most cases because they feel it is necessary to eliminate the septic vein. One should not follow either method to the exclusion of the other. Ligation is sufficient when we are dealing with a case early in its course, the disease presumably not being far advanced, when the diagnosis is certain, when longer procedures are contraindicated, or when we find an apparently normal jugular vein. Excision should be used when the vein has become frankly involved below the common facial. A low ligation involves tying all the tributaries and this procedure is just as time consuming as excision and has not the additional advantage of removing the septic tissue. I believe, therefore, that ligation should be employed only when we can place a ligature about an apparently healthy vein above the common facial; excision should be used when the vein is manifestly involved below that point.

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DIATHERMY AND PHYSICAL AGENTS IN GENERAL PRACTICE*

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IT has taken the medical profession thirty-seven years to show an appreciation of the possibilities of medical high-frequency currents," commented D'Arsonval, in a personal interview of this French savant with Kobak in 1924.

Gradually, slowly but surely has come an appreciation, not only of the use of electric currents in medicine, but of the entire subject of physical therapy. The fad and fancy stage of the subject has been passed. The false theory that its results are purely psychic has been outlived and lived down, the subject has gone through a period of intense investigation since the war, and consequently much of the mysticism and many of the supposedly superhuman reactions caused by treatments with the varying modalities under this head have been explained and exposed.

Now that we know all the reactions are governed by the unalterable laws of physics and physiology it is not considered such a deep subject.

"The physical measures included under the term physical therapy are used only in an effort to convert an inadequate physiological reaction in the body into one that is adequate."

According to Titus,² three reactions in the use of physical forces can be brought about, and upon the actions of these results we depend in our effort to help the patient overcome the condition present. The three reactions that can be produced are formation of heat, where and to what degree we want, the effects of mechanical motion or exercise and some weak but potent chemical reactions.

That is all that physical therapy does: produce heat, produce more motion than the body itself is capable of exerting in certain locations, and produce chemical reactions sometimes of distinct benefit to the body.

To produce mechanical reactions, we have a very valuable method, and that is by massage and exercise. Had the medical profession years ago

not believed that massage was too unprofessional for them to direct or administer, we would not today have the foolish competition to our decent methods of treatments from chiropractors and other rubbing cults. They are making capital of the fact that massage and exercise can produce some results even though the members of these cults are too ill-informed to appreciate the indications and contraindications.

The other method of inducing mechanical effects is the use of static electricity. This is a current of extremely high voltage or pressure and low amperage or volume. It was the original electric current used for therapeutic purposes in medicine. Because of a more scientific understanding of the subject it is coming back into its own.

Regarding the chemical reactions that can be produced, our knowledge of the very beneficial effects that are obtained by the administration of ultra-violet light is almost daily increasing. One of the most potent effects is its influence upon phosphorus and calcium metabolism in the treatment of rickets and tetany. The chemical reactions induced by the galvanic current are extremely weak and have a limited field.

For the production of heat within the body there are available two extremely potent methods. By means of the radiant light from an incandescent bulb, heat can be made to penetrate the tissues to a depth of 1.5 inches as proven by Karl Sonne of the Finsen Medical Light Institute of Copenhagen. In many cases it is a very valuable substitute for diathermy. The other means of heat production is diathermy. Contrary to the usual understanding of the layman it is not an electrical phenomenon. Under proper treatment there is no shock. The heat is produced inductively, through the resistance of the part treated to the passage of the high frequency current; not conductively, as in the case of the hot water bottle, heating pad or cautery. Even where the diathermy current is pushed to the point of destruction of tissue, as in surgical treatment, the electrode remains cold.

*Read before the annual meeting of the Southern Minnesota Medical Association, Austin, Minn., Sept. 30 and Oct. 1, 1927.

"Diathermy is probably the most common word used and best understood; but thermo-penetration is more expressive." By it we mean putting heat through or deep into the tissues. This is accomplished by means of the high frequency current. To produce this current, a machine is employed which steps up the ordinary lighting current first from 110 to several thousand, and the oscillations or alternations from the usual 120 or 60 cycles to many hundreds of thousands times per second. This type of current then is called also D'Arsonval, after a Frenchman who in about 1890 demonstrated that the main effect of this high frequency current in the body was the production of heat.

The insurance of the passage in parallel lines from one electrode to the other of the high frequency current is the voltage behind it. It is evident therefore that a machine would to give a high milliamperage and relatively low voltage will have less ability to overcome resistance and consequently less power of deep tissue penetration than one constructed to deliver a much higher voltage with less milliamperage. In all other electrical currents, except the static, the electrical lines of force do not go in straight lines through the tissues from electrode to electrode, but are diffused in widely scattered ones, and are only concentrated at the points of contact of the electrodes. Hence it necessarily follows that the deeper structures are much less under the influence of the electrical current.

Diathermy may be divided into medical and surgical. The latter will not be considered in this paper.

Medical diathermy may be divided into direct and indirect. Autocondensation is the most important example of the latter.

Diathermy, then, as we shall use the term, is true converse heat, that is, heat generated within the tissues; hence it penetrates deeply and to a great degree uniformly.

The methods of application of direct diathermy may be briefly mentioned as the lateral, double cuff, and cuff and water.

Materials usually used for electrodes are 22 gauge block tin, and mesh. The dosage used is from 50 to 100 milliamperes per square inch on the smallest electrode. The duration of treatment varies. Frequency of treatment depends upon the underlying pathology.

Pedersen³ says the physiological results are more important than meter indications or those of the thermometer.

The contra-indications to diathermy are two.

1. Pus without drainage.

Quoting from Pedersen,⁴ "Where there is pus, evacuation is one of the insurmountable rules of surgery, and in physical therapy great caution must be exercised unless there is an outlet for the pus as the solvent action begins; otherwise probably dangerous absorption is instituted. Probably the success of diathermy in pneumonia rests on the principle that as soon as the current begins to soften the consolidation, evacuation of the inflammatory product begins and is carried on by expectoration. In general even small quantities of pus had best be left to incision by the surgeon before the application of physical measures, except, perhaps, radiant light, which does not pass through and through the accumulation."

2. Lesions where there is a likelihood of hemorrhage, as for instance in gastric ulcer.

THE APPLICATION OF DIATHERMIA

Let us consider the effect of physical heat upon chemical reactions in general. Every degree of heat up to a certain point will hasten the chemical reaction, as can easily be proven by numerous laboratory experiments. The digestive action of normal enzymes is hastened by each degree of heat added, up to a physiological limit. Considering the reactions of nature's protective enzymes and antibodies that are normally found in the blood to be chemical in nature, therefore, heat to a physiological degree, applied in the proper place to activate these enzymes, would naturally have a beneficial effect by hastening and increasing their activity. Heat up to a certain degree above body temperature will activate phagocytes and increase the opsonic index.

Heat applied to contractile tissues will produce relaxation; applied to arterioles and capillaries it produces a dilatation of these vessels and causes arterial hyperemia. Heat, being sedative in nature, will relieve pain when applied directly to the diseased tissue cells, whether pain be caused by toxin or mechanical injury to the body cells. A constructive nutritive arterial hyperemia is instituted in contradistinction to the vena static hyperemia of Bier.

Nature alone may succeed by her own method of combating infection and resolve most of the fibrosis following acute inflammation; and some of it, in chronic inflammation. If our original

premise is correct the increased enzymatic action of the blood is the factor which accomplishes the resolution of beginning fibrosis in acute inflammation as well as in old chronic fibrosis.

Another possible effect of diathermy, or any heat above 110° F., on many bacterial cells is attenuation. The germ is made less virulent to the body tissues and less able to resist the solvent action of the greatly activated normal enzymes and antibodies of the blood. Thus diathermy increases the resistance of the body tissues against infection, while at the same time lowering the vitality of the germ, hindering it in its fight for supremacy.

It is not intended to give the impression that good therapy should exclude any scientific method of treatment. Adjuvants should never be neglected. Physical therapy should be included as a valuable assistant to any and all good measures. If the salicylates alone will enter the blood and serve their purpose in the inflamed joint of acute articular rheumatism without any other aid than that given by nature, how much better work can they do if they are forced through that joint in much greater quantity by quickly establishing an intense arterial hyperemia in the diseased area, by the use of diathermia? By the foregoing I wish to convey the idea that physical therapy and diathermia is an aid to rational drug treatment.

One of the specific reasons why surgery superseded therapeutics and almost elbowed it out of the arena was the superior accuracy of method and clean cut results of the one as compared with the relatively uncertain, hit-or-miss character of the other. Medicine fired grape shot from a blunderbuss; surgery performed accurate target practice with a carefully sighted rifle. Is it any wonder that the profession and the public turned impatiently from the vagueness of the one to the precision of the other?

While it is true that physical therapy, in its various modalities, constitutes, in a sense, a special form of treatment, and its technical development is necessarily in the hands of a few men, yet it is not, and must not be regarded as, a specialty of medicine in the sense that ophthalmology, or urology, or similar branches of medicine, are specialties. It is a mode of therapy for use in every department of medical practice in which, and to the extent to which, it is applicable.

There is not a physician in the entire profession, from the general practitioner to the most exclusive specialist in the most specialized branch of medicine or surgery, but should be interested in physical therapy, and will find it an important (and ultimately indispensable) aid in the cure and relief of his patients.

If it be agreed that physical therapy is but an integral part of the physician's practice, it follows as an inescapable corollary that no physician's equipment is complete without a knowledge of physical therapy and the means of applying it to the treatment of proper cases. The recognition of its proportionate place in medicine, moreover, does not preclude an equal recognition of the fact that there are conditions, unamenable to other forms of medicine and surgery, in which physical therapy has already been shown to give excellent results, and undoubtedly more and more such conditions will be brought to light as it is developed.

By way of clinical application I wish to point out a few conditions where physical therapy may be considered to be the only means of giving benefit to those afflicted.

In the field of gastro-enterology for instance, there is an apparent change in the viewpoint of surgeons regarding the advisability of operative procedures in certain abdominal affections. This change is due to the ever increasing number of cases in which symptoms persist, or are aggravated, or new ones appear after operation.

Some of the conditions following under this head are gastric and pyloric ulcers, chronic cholecystitis, adhesions about the cecum, diagnosed and operated upon for chronic appendicitis. When necessary, to physical therapy must be added proper diet, and drugs for more immediate relief of the symptoms and to secure comfort to the patient.

Speaking of end-results in surgery, Secor⁵ says "that it is not in technic that more perfect end-results are to be obtained, but in possibly more detailed preoperative study, and a more intelligent and painstaking after-treatment."

Many of the cases coming to surgery have tried various physicians and sundry cults. They are sick in mind as well as body; they have sick habits; they think sick thoughts. To simply perform an operation on this class of patients and turn them loose will produce perfect end-results in very few cases.

It is natural for sick people to want something done for them; they like personal contact, the touch of the hand, the use of head light, etc., anything that gives the suggestion of action, that the physician is really doing something. Anything that will intensify the effect of therapeutic suggestions will aid in securing better end-results.

A great many physicians and surgeons have taken it for granted that psychic effect is the Alpha and Omega of physio-therapeutic efficiency, expressing themselves on physical therapy in general as a "lot of bunk."

Numerous instances could be cited from the literature of men like Ochsner, of Chicago, becoming enthusiastic over the improvement in wound healing under the simple incandescent light.

In general abdominal conditions that offer themselves for physical therapy may be stated to be any case that does not require immediate surgical intervention. Acute pus conditions, indurated ulcers, frequent or severe gallstone or appendicitis attacks are cases that are strictly surgical. Chronic conditions such as gastric and duodenal ulcers, perigastritis, periduodenitis, chronic cholecystitis with or without adhesions, adhesions about the cecum, pelvic adhesions, chronic salpingitis and post-operative adhesions about the gallbladder regions, stomach, cecum, colon or pelvis, result in a host of patients referred to as the "chronic incurables." They hound the physician constantly and are frequently the only black spots in an otherwise successful practice.

The incurable cannot be cured of course. However, the definition of "incurable" is oftentimes based only on hygienic, dietetic and drug methods. What may be incurable under these circumstances may become curable under a rational combination of measures.

With the advent of physical therapy splendid results have been and are obtainable in these cases. Also by the use of physical therapy in these cases there is built up in the minds of the laity a feeling of confidence in the conscientious physician, a feeling that we all know has been slipping as the result of not only poor results obtained by treatment either medical or surgical alone, but also of propaganda by the non-medical cults.

In the type of cases just cited it is of course absolutely essential to obtain as accurate a diagnosis as possible, and only when the diagnosis is established as well as it is possible to make it, is the time to institute proper treatment by physical therapy.

A good rule is, "No diagnosis, no treatment."

In reading the report of the Medical Defense Committee of the North Dakota State Medical Association,⁶ it was noted that, of the twenty-eight cases pending against doctors, twelve had to deal with fractures. This high percentage of fracture cases in the courts indicates that the public is far from satisfied with the results of the treatment in this class of cases.

It may be that the cause of dissatisfaction lies largely in the after-treatment, which in general may be said to be suffering from insufficient attention of the doctor, who is mostly interested in reduction of the fracture and willing to take a gambler's chance on the functional end-result.

Many very able books on fractures have been published, but the few notes they contain on the after-treatment are usually misleading and hazy to say the least.

It is not our purpose to give a dissertation on the treatment of fractures, but in giving a short résumé of the physiology in the healing of a fracture, based on the most recent experimental work on bone repair, to show how the application of physical means may be synchronized with chronological bone repair.

What happens when a fracture takes place and how the repair may be aided is best discussed under five headings.

1. There is hemorrhage immediately following a fracture, which is central, subperiosteal and muscular and may extend along fascia and subcutaneous tissue. The hemorrhage produces symptoms of pain, swelling and muscular spasm. This indicates clearly nature's attempt at immobilization and, after the best possible reduction has been accomplished, our efforts should be to maintain this reduction by effective, but not constricting, immobilization.

2. Within a few hours after the fracture, a productive inflammatory process begins which, through the granulation tissue formed and the exudate of fibrin and serum, changes the hemorrhages into a hematoma. The clinical symptoms of pain, swelling and muscular spasm per-

sist, which tells up to keep hands off and maintain immobilization.

3. Forty-eight to seventy-two hours after reduction the blood clot surrounding the fragments is further organized by connective tissue growing in from the periphery. Osteoblasts appear on the stage and some bone matrix is formed from the intracellular substance. By this time, the pain and spasm have disappeared and the swelling has decreased.

4. On the fourth or fifth day, there is a soft callus consisting of osteoid tissue. The calcium salts (phosphates and carbonates) are deposited in the connective tissue stroma of the perivascular areas. The salts are carried in the circulation by colloids and carbon dioxide and are also available from the fractured ends of the bone by a process of demineralization and atrophy.

The calcium salts are in solution in an acid medium. It is therefore believed that the hydrogen-ion concentration becomes lowered, and, when this reaches a certain point below that of the blood plasma, precipitation of the calcium salts occurs. If at this stage the splinting permits, it is easy to see how the application of heat will help to restore the condition of the soft parts about the fracture. The physiological action of heat, however, will also tend to lower the hydrogen-ion concentration of the blood and, therefore, is helpful in the precipitation of calcium salts.

5. Between the second and third weeks, the connective tissue is well organized and new blood vessels are seen. Osteoid tissue appears in the perivascular areas and there is a gradual transition in the appearance of the cells from connective tissue to osteoid tissue to bone.

The absorption of excessive callus begins and there are signs of re-establishment of the bone marrow. It is at this stage that the patient complains of stiffness in the contiguous joints and the soft parts about the fracture are described as being without life. The fracture may be said to be convalescing, where the bone repair has gone on to soft callus and there is no muscular spasm, swelling or pain which contraindicates manipulation.

By using the foregoing as a criterion for after-treatment, it seems rational to fix the end of the second week after reduction as the beginning of after-treatment.

Gentle massage of the soft parts above and below the fracture is of great value, but any massage over the callus is no help and may produce excessive callus and myositis ossificans. It is not difficult to conceive how massage may dislodge osteoblasts and spread them into the soft tissue and accelerate their growth or increase the transition of connective tissue cells or muscle cells into bone-producing cells.

Sir Robert Jones⁷ gives the main physiological effects of massage:

1. Assisting the circulation.
2. Aiding the movement of lymph.
3. Exerting tension on some structures which we hope to free or stretch.

Championniere,⁸ in the study of crushed tissues after the application of massage, found histological evidence that: (1) the muscle appeared normal; (2) no secondary fibrous bands separated the muscle fibers; (3) no fibrous thickening around the blood vessels; (4) the general bulk of the muscle was greater; and (5) no signs of hemorrhage, in contrast to dissociation of the muscle fibers and evidence of signs as given under 2, 3, 4 and 5.

The use of heat may be externally by means of radiant light which produces rays in the red end of the spectrum which are capable of considerable penetration. When these rays strike the body, there is an increase of surface temperature. To protect against excessive increase, the heat-regulating mechanism responds with a hyperemia. The capillaries are dilated, heart action is increased, and the circulation accelerated. Heat is carried into the systemic circulation and some is eliminated through more rapid respiration. The sweat glands increase their activity and begin to eliminate and there is a tendency to keep the body temperature at a constant level. The muscles relax because of the sedative effect of the heat on the sensory nerve endings, and its action reflexly on the deeper structures.

The other means of heat production is diathermia. By means of intradermal injections of normal saline, Hansson and Birrell⁹ determined that in normal individuals without treatment it required sixty minutes to absorb two minims of the solution. Such an area exposed to radiant light reduced the time to thirty minutes. Diathermia gave approximately the same results, and massage reduced the time to ten minutes.

Where the fracture involves or is near a joint, so-called therapeutic exercises are also indicated, which may be divided into active, that is, voluntary contractions of muscles by the patient; passive, where exercises are performed on the patient by means of an apparatus or a technician; and resistive, performed by a technician in co-operation with the patient.

In closing I may say that the successful practitioner holds fast to two cardinal facts.

1. He knows he must get results with his sick patients by taking advantage of every means to accomplish his object.

2. He knows he must impress his patient with the fact that he is doing something for him.

Physical therapy provides the physician with the third unit of the triad, medicine, surgery and physical therapy. As in medicine and surgery, to accomplish results it requires the fine senses of the physician and the utmost potentiality of his brain in becoming acquainted with the patient and his disease, so that he can make correct diagnosis and proper selection of cases. There is also necessary a knowledge not only of the choice

and technic of the modality proper for these cases but also a knowledge of the pathology of the condition we are attempting to treat. We must not fall into the error of thinking that we can press a button, turn on a current and cure every ill to which human flesh is heir.

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VITAMINS A AND D IN COD LIVER OIL

Accumulated evidence seems to have established the fact that vitamin A is not identical with the antirachitic factor; as a consequence, vitamin D has been postulated. Work has been published which shows that some cod liver oils, rich in vitamin A were poor in vitamin D and that others rich in vitamin D were poor in vitamin A. The importance of this matter may be appreciated when it is pointed out that some commercial firms whose products have a satisfactory vitamin A content claim, *ipso facto*, a satisfactory content of the antirachitic factor vitamin D. The Council on Pharmacy and Chemistry has previously attacked this fallacy. In the new section on Vitamin Foods to appear in the chapter on Medicinal Food in New and Non-official Remedies, 1928, the Council states that it does not feel justified in requiring any specific test or standard of antirachitic potency, but it announces the policy of encouraging manufacturers to adopt and publish such methods of testing as will enable them to guarantee a vitamin D potency for their products. For products admitted to New and Non-official Remedies the Council permits no claim of vitamin potency unless it is backed up by adequate tests for the kind of potency claimed. (Jour. A. M. A., March 10, 1928, p. 770.)

SANATOLOGY "THE ONLY SCIENCE OF HEALTH"

"Sanatology" is a new cult. In 1927, Percival Lemon Clark went before a committee of the Legislature of Illinois in behalf of "House Bills Nos. 296, 297 and 411." These bills were for the purpose of getting legal recognition of the cult, Sanatology. Dr. Clark has advertised through newspapers and by radio. He sums up his attainments, thus: "I cure the sick, cure the desperately sick, cure asthma, cure rheumatism, cure hay fever, cure goiter, and all the rest of the 'incurable' diseases." Dr. Clark's merchandise accessories comprise such products as "Dr. Clark's Dextrinized Wheat Health School Bran," "Cereal Bran," "Cracked Wheat," "Steel Cut Oatmeal" and "Dr. Clark's Cooked Whole Wheat." Then there is a "Sanatology Blower"; the "Sanatological Enema Bag and Attachments"; the "Sanatological Oil" and the "Health School Laxative Tablet." Dr. Clark's *magnum opus* is "How to Live and Eat for Health," which is a book of 240 pages, devoted mainly to Dr. Clark's peculiar theories, dietetic and medicinal, and incidentally to advertising Percival Lemon Clark and the Health School. (Jour. A. M. A., March 31, 1928, p. 1060.)

CASE REPORTS

TOXEMIA OF PREGNANCY: A COMPARISON OF TWO DISSIMILAR CASES*

MARTIN S. SICHEL, M.D.
Minneapolis

Case 1.—M. E., aged 24, was admitted for the second time to the Minneapolis General Hospital on November 3, 1927. Prior to her first admittance in January, 1926, her past history had been negative except for measles at the age of 14.

On the first admission, there was a generalized anasarca, a blood pressure of 186/130, with four plus albumin but no casts. The blood creatinine was 1.62 mg. per 100 c.c. blood, the urea 24.5 mg., and the non-protein nitrogen 45.2 mg. Eliminative treatment was used and a spontaneous abortion of a three months fetus resulted in a marked improvement. At the time of discharge, the blood pressure was 164/100 and there was a trace of albumin in the urine.

On the day of her second admittance, the patient showed a pregnancy of 26 weeks, the last menstrual period being April 15, 1927, and the date of expected confinement January 22, 1928. She had had no prenatal care, or any observation between her first and second pregnancy. Her chief complaints on admission were headache, blurred vision, and a generalized edema.

Physical examination showed a young female with a marked pallor of the face, marked edema of the face and puffiness about the eyes so extensive as to almost close the lids. There was also an edema of the entire body, especially marked in the lower extremities, where deep pitting on pressure was present. The pupils were equal and reacted to light, the teeth were in poor condition, there being four carious upper teeth that needed extraction; tonsils were atrophic and buried; the thyroid was not enlarged. The breasts showed the usual signs of pregnancy. The heart and lungs were essentially negative. The fundus of the uterus was palpable two finger breadths above the umbilicus and the fetal heart was heard in the right lower quadrant, regular, with a rate of 160. The pelvic measurements were normal. Vaginal examination showed an undilated cervix lying high in the pelvis. There was an acute endocervicitis with marked purulent discharge.

The pupils were dilated and the fundi examined. Both fundi showed numerous areas of whitish exudates, areas of hemorrhages, and marked edema and swelling of the retina. This was diagnosed as an albuminuric retinitis.

The blood pressure on admittance was 252/174. The urine showed a specific gravity of 1.011, albumin four plus, and many red and white blood cells. A quantitative Esbach's estimation showed six grams of albumin

per liter. The Wassermann reaction was negative.

Two hours after admission, the patient had a convulsion lasting two minutes, followed by a period of coma; this was followed by another convulsion one hour later. It was deemed advisable to terminate the pregnancy at this time. Under nitrous oxide-ethylenic anesthesia, the cervix was sufficiently dilated to permit the introduction of a number three Vorhees bag. The bag remained in the uterus for seventeen hours, during which time she had two more convulsions. One and one-half hours after the expulsion of the bag a spontaneous delivery of a stillborn fetus of about

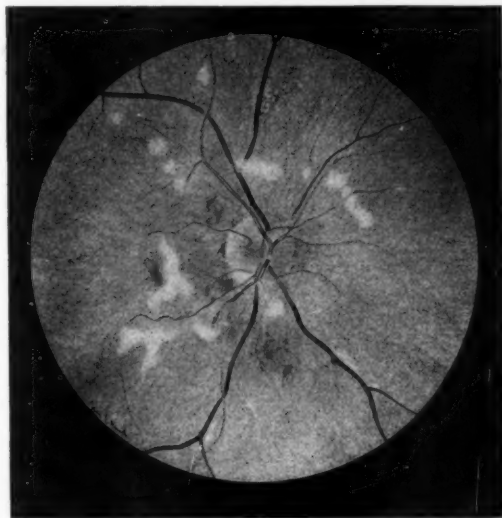


Fig. 1. Albuminuric retinitis. Fundus of right eye, 1 month after delivery. Edema and swelling of disc. Areas of exudation and hemorrhages.

twenty-six weeks gestation occurred. There was no maceration. The fetus presented by the breech. The placenta was complete, there being several small areas of whitish infarcts present.

During the time the bag was in situ, the Stroganoff treatment was used with alternate doses of morphine and chloral hydrate sufficient to force the respirations down to 8-10 per minute. The pulse during this time varied between 120 and 160 per minute. Adjuvant treatment consisted of a gastric lavage and colonic irrigation with glucose and soda bicarbonate solution to promote elimination. Fifteen minutes after delivery the blood pressure dropped to 210/150 and forty-five minutes after delivery it had dropped to 170/130. The patient's general condition was fairly good and the prognosis favorable at this time.

The accompanying charts show the blood pressure

*From the Obstetrical Service of Dr. F. L. Adair at the Minneapolis General Hospital.

curve and the urinary findings with the output and intake of fluids during the month following delivery. There was a complication during the first ten days postpartum of an acute bilateral pyosalpingitis with large adnexal masses palpable as high as the umbilicus. The temperature varied between 101 and 103° for one week and the pulse 130-150 during this time. The vaginal smears were positive for gonorrhea. During this period it was necessary to catheterize every six

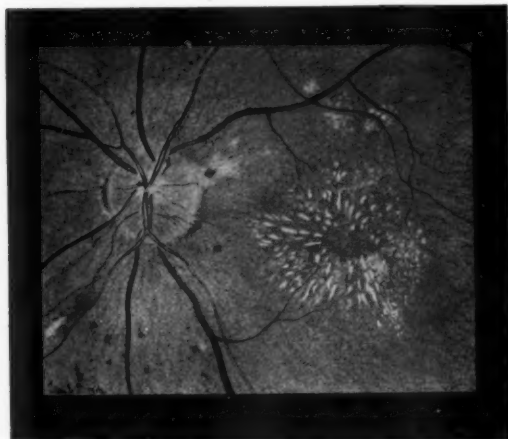


Fig. 2. Albuminary retinitis. Fundus of left eye, 1 month after delivery. Swelling and edema of disc with surrounding exudation. Typical star-shaped figure at macula.

hours. From the tenth day on the patient's temperature reached normal limits, the pulse gradually falling to 90, and improvement was rapid. The adnexal masses gradually disappeared from abdominal palpation.

At the end of one month postpartum, the hemoglobin was 70 per cent and the R.B.C. 3,440,000, the lowest findings having been hemoglobin 40 per cent and R.B.C. 1,930,000. A P.S.P. test for kidney function at this time showed 45 per cent of the dye excreted in the first hour and 24 per cent excreted in the second hour, a total of 69 per cent.

The eye grounds at this time still showed evidences of recent hemorrhages, whitish spots of exudation which were slowly absorbing, and a few spots of hyaline degeneration. There was also some swelling and edema of the retina with a definite elevation of the vessels at the disc margin. The condition of the fundi was definitely improved since the first examination. The accompanying drawings show the condition of both fundi at one month postpartum.

During the sixth week postpartum there was a change in the patient's condition characterized by upper abdominal pain with nausea and vomiting persisting for a few days. Examination at this time showed tenderness and muscular rigidity over the right upper quadrant, no enlargement of the spleen or liver, and a slight icteric tint to the skin. The blood pressure rose to 190/130 and the patient suddenly went into a typical convulsion lasting a few minutes and followed by

a period of coma. This convulsion was again repeated on the following day, lasting only a few minutes.

During the remainder of the second month postpartum, the convalescence was undisturbed and recovery rapid. The urine during this time contained from two to four plus albumin and occasional casts. Quantitative estimations varied between 0.45 gms. and 1.75 gms. of albumin per liter. Daily 24 hour specimens of urine showed a fixation of specific gravity ranging between 1.006-1.015. The blood pressure varied between 154/130 to 176/134; the temperature was entirely normal; and the pulse averaged 80-90.

At the end of the ninth week after delivery, the patient was up and about, on a salt-free low protein diet. The four carious teeth had been extracted, the condition of the fundi had further cleared up and the general condition was good.

This case is of interest for several reasons:

1. A definite toxemia occurring in the same patient in her first two pregnancies.
2. The early termination of pregnancy, the first time spontaneously at three months and the second time artificially at six and one half months.
3. The marked similarity of the findings in the two pregnancies.
4. The presence of a definite chronic glomerulonephritis rather than the usual type of nephrosis, encountered in these conditions.
5. The probability that the present condition was an acute exacerbation of a chronic nephritis and that the convulsions were due to a uremic condition rather than eclampsia.
6. The permanent injuries to the eyes and kidneys

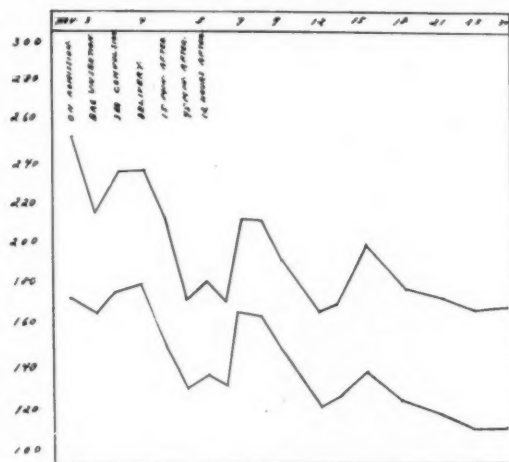


Chart I. Blood pressure curve of Case 1.

and the inadvisability of this patient ever becoming pregnant again.

Case 2.—G. P., aged 39, a primipara, was admitted to the General Hospital on December 16, 1927. She had had scarlet fever, measles, and pertussis during childhood and an operation for appendicitis and right cystic

CASE REPORTS

	Nov. 3	5	8	11	14	17	21	24	28	Dec 2
Intake (Fluid)	300 c.c.	735 c.c.	1060 c.c.	1000 c.c.	2000 c.c.	1800 c.c.	2200 c.c.	1850 c.c.	800 c.c.	1250 c.c.
Output (Urine)	250 c.c.	1050 c.c.	1485 c.c.	1500 c.c.	2975 c.c.	3100 c.c.	2550 c.c.	1450 c.c.	1100 c.c.	1025 c.c.
Albumin (Qualitative) Urine	++++	++++	++	++	++++	+	+	++	+++	++
Albumin (Quantitative) Urine	6 grams		6.4 grams	245 gms.		28 gms.				
R.B.C. in Urine	++++	+++	++++	++	+++	+				
Blood Creatinine							1.75 mg.			
Blood Urea		22.6 mg.	22 mg.				16.3 mg.			
Blood Uric Acid		6.14 mg.		6.3 mg.			2.1 mg.			
Van Slyke			48%							

Chart II. Urinary and blood findings—output and intake—Case 1.

ovary in 1915. The last menstrual period was June 13, 1927; quickening occurred November 8th; the date of expected confinement was March 20, 1928. The patient had been under prenatal care for six weeks. The course was normal until a few days before admission, when a sudden rise of blood pressure to 170/120 and

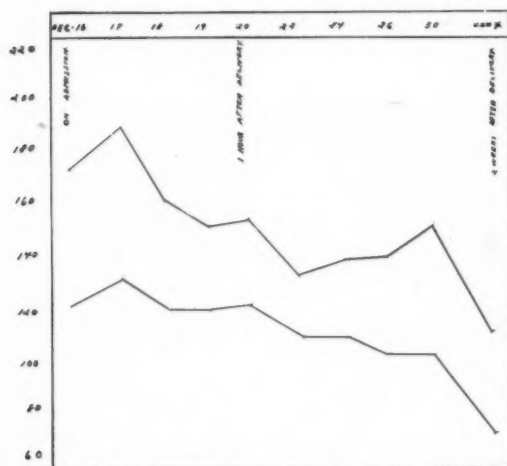


Chart III. Blood pressure curve of Case 2.

a four plus albumin content of the urine was discovered.

The chief complaints on admission were severe occipital and frontal headache, dizziness, blurred vision, weakness, severe epigastric pain, nausea, pains in the chest, dyspnea, orthopnea, and a non-productive cough. Physical examination showed a middle aged female, acutely ill, suffering from hyperpnea and epigastric pain. The head and neck were negative, the heart was normal except for a tachycardia, the pulse ranging from 130 to 150. The lungs showed a marked degree of pulmonary edema with dullness and moist râles at both bases, reaching to the fourth dorsal vertebra posteriorly on either side. The abdomen showed a gestation of about six months; the fetal heart could be heard. The lower extremities showed only a very slight edema. Examination of the eye grounds showed no changes in the fundi.

The blood pressure on admission was 172/122, rising 24 hours later to 186/130. The urine showed a specific gravity of 1.050, four plus albumin and many hyaline casts. Quantitative estimation showed 19 grams of albumin per liter; the urine boiled solid on qualitative estimations. The total output of urine in the first twenty-four hours was only 300 c.c. The hemoglobin was 100 per cent; R.B.C. 4,670,000; W.B.C. 16,050 and the Wassermann was negative. The urea nitrogen was 15.9 mgs. per 100 c.c. blood, and the Van Slyke estimation 45 per cent.

At the end of twenty-four hours after admission the patient's condition seemed worse. In the face of a rising blood pressure, an increasing pulmonary edema and increasing pulse rate, and the marked albumin

content of the urine, it was decided to induce labor. There had been no convulsions at any time.

Under ether anesthesia the cervix was dilated sufficiently to admit a No. 3 Voorhees bag. The bag was expelled 62 hours later, at which time the cervix was dilated four fingers. Delivery of a stillborn premature infant was then completed by podalic version and extraction.

Recovery was rapid after delivery, the blood pressure dropping to 136/104 two days later; the pulmonary edema rapidly subsided; the pulse rate dropped; the albumin content of the urine subsided to 1 gram per liter by the third day, and the specific gravity of the urine dropped to 1.009. The highest reading of the albumin content occurred during the second day following the insertion of the bag, at which time it was 20.8 gms. per liter.

At the time of discharge, two weeks after delivery, the headaches, epigastric pain and distress and pulmonary edema had entirely subsided. The only complaint at this time was a slight dizziness. The blood pressure had fallen to 110/64 and there was only a very faint trace of albumin in the urine. Convalescence had been entirely afebrile and free from infection, and recovery was complete.

This case is of interest for the following reasons:

1. All the symptoms and signs of the case are typical of a severe eclampsia, terminating in complete recovery.
2. There were no convulsions.
3. The kidney lesion was the true temporary type of nephrosis which occurs in the pre-eclamptic and eclamptic toxemia of pregnancy.

SUMMARY

A toxemia of pregnancy was presumably present in each of these two cases. The first case can be classified as an acute exacerbation of a chronic glomerulonephritis during pregnancy and complicated by convulsions. The second case is a true eclampsia of pregnancy with nephrosis but without convulsions.

STREPTOCOCCUS INFECTION OF PENIS

REPORT OF CASE

EDWARD BRATRUD, M.D., F.A.C.S.
Warren, Minnesota

C. S., aged 18, referred by Dr. O. of Hallock, Minnesota.

Family history and previous history unimportant.

Present Complaint—Eleven days ago while shocking barley, experienced a sudden sharp pain in penis, but patient went on with his work until four or five days later, when he noticed a slight discomfort. Six days after incident, he had considerable pain in the penis and on examination noticed a slight discharge. Pain and discomfort gradually became worse so he had to quit work and on the seventh day consulted a doctor. He was hospitalized under rest treatment with hot packs. Swelling of the penis and general discomfort grew progressively worse until, the eleventh day following injury,

the patient was referred for diagnosis and treatment. He had had increasing difficulty in voiding for past 48 hours.

Examination—The patient is a well developed and fairly well nourished adult male, pale and extremely septic, almost moribund in appearance and in very great pain. Body weight 136. Blood pressure 130-70. Pulse 116. Temperature 103. W.B.C. 25,000 with 82% P. M. N's.

Examination of Penis—The member is unusually large, boggy, swollen and slightly tender, measuring 10.5 inches in length by 5 inches in diameter at its thickest portion, with the most prominent swelling in the distal half ventro-laterally. A brawny edema involves the scrotum and spreads over the pubes. The bladder is greatly distended. A slight urethral discharge of light viscid character contains a few gram positive diplococci and very occasional streptococci and staphylococci.

Immediate operation was deemed advisable. Under gas anesthesia a perineal urethrotomy was performed and 2900 c.c. of clear urine was released from a distended bladder with a No. 28 French catheter.

Urethroscopy revealed the maximum induration 5.5

inches back of the meatus, and incision of the indurated area through the urethroscope released about 90 c.c. of foul pus. A counter opening was made in the penis ventro-laterally and continuous tube drainage was made through this and the urethral meatus.

The postoperative condition was fair. Involved areas were covered by massive hot moist bichloride packs. Immediate blood transfusion was followed in two hours by glucose saline intravenously, with a minimum of 4500 c.c. of fluids subcutaneously and intravenously every twenty-four hours for the first two days. Swelling gradually subsided and the drainage tube was removed on the fourth day. Drainage ceased completely on the ninth day.

The urethrotomy tube was removed on the tenth day. Further convalescence was uneventful. The patient was discharged on the fourteenth day following operation, voiding nicely, and the urethra dilated to 30 French.

Cultures showed pure short-chained streptococci. Blood cultures were negative. No evidence of the barley beard at any time.

Examination three weeks later showed the condition excellent. The urethra dilated easily to 32 French.

President's Letter

IT IS important that the County Societies elect delegates to the State meeting who will be present and properly represent them. This meeting will be an important one. There will be many problems coming up for discussion. Officers will be elected and plans will be discussed for the coming year. In addition to the meeting of the House of Delegates, there will be clinics at the Minneapolis Hospitals given by prominent men in our profession throughout the country, on Monday and Tuesday. Wednesday, Thursday and Friday we can all attend the scientific sections of the A. M. A.

There will be no scientific program for the State Association this year. This seemed like a wise decision on the part of the House of Delegates because it would be impossible to arouse interest in another scientific meeting this spring, and in the fall we have the Northern and Southern Minnesota meetings, which are quite enough. It seemed much better to give them our support and a large attendance than to attempt a meeting of the State Association.

The omission of the scientific program will save the State Association \$1,200. Part of this money is to be spent in entertaining the House of Delegates of the A. M. A. at a dinner Monday night, June 11, at the Nicollet Hotel. This will give our delegates an opportunity to meet members of the Associations of every state, and to hear inspiring talks from the leaders in our profession.

The State Medical Association and the Hennepin County Medical Society are joint hosts of the A. M. A. Our responsibility is almost entirely social, as the A. M. A. takes care of its own scientific program. Every member should come if possible, bring his automobile along and show strangers the beauty of the Twin Cities and the surrounding country. Invite them home with you after the meeting, and show them the wonderful recreational possibilities of Minnesota. We want every visiting doctor to carry away with him an unforgettably agreeable memory of this meeting.

C. B. Wright

EDITORIAL

MINNESOTA MEDICINE

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Vol. XI May, 1928 No. 5

The A. M. A. Meeting

Minneapolis is to be host for the seventy-ninth annual session of the American Medical Association in June. Fifteen years ago the Association met in Minneapolis and the chances are that another fifteen years will elapse before the profession of the state will again have an opportunity to attend the national meeting within our gates. Seeing and hearing men of national reputation is in itself an inspiration and the later reading of the published papers will take on a new interest.

The A. M. A. assembly is the largest medical convention in the world and, although the western meetings are not so large as the eastern, the attendance runs well up into the thousands.

Every Minnesota physician should avail himself of this unusual opportunity.

The meeting officially opens on Monday, June 11, with the convening of the House of Delegates at 10 A. M. in the ball room of the Nicollet Hotel. Minnesota has three representatives—Drs. Rothrock, Litzenberg and Burnap. Registration opens at 8:30 A. M., Monday, June 11. Clinics have been arranged for Monday and Tuesday to be conducted by some of the visiting men who are outstanding in the various specialties. The general meeting Tuesday evening constitutes the opening exercises of the Scientific Assembly, to be followed Wednesday, Thursday and Friday by the various sectional meetings.

The entire space allotted for scientific and commercial exhibits has long ago been taken. The commercial exhibit promises to be even larger than the one last year at Washington. The scientific exhibit, a comparatively recent addition to the program, will be distributed over the various specialties and promises to be most instructive. Dr. E. T. Bell is chairman of a local committee in charge of a fresh pathology exhibit. Dr. F. L. Adair will head a committee which will present a special exhibit on the subject of gonorrhea in women. A series of demonstrations of the newer laboratory methods will be put on for the benefit of general practitioners and the committee on fractures has arranged for an extensive exhibit on methods and appliances for this branch of practice.

A word to the wise is sufficient.

The State Medical Association

The Minnesota State Medical Association is to hold no scientific meeting this year. This fact should not detract from the interest in the meeting of the State House of Delegates which will be held at the time of the A. M. A. convention in Minneapolis in June. Each year important matters, for the most part committee reports, are brought before the House, and this year will prove no exception.

Considerable recent interest has been manifest in several matters which will be the subject of

committee reports. It is generally felt that some constructive measure should be taken, for instance, regarding contract practice in general. It is felt in some quarters that insurance work is being awarded on the basis of a low fee schedule rather than high professional qualifications.

How far the organized profession should go in so-called educating the public is a question which has not been fully settled in Minnesota, and in fact may never be finally settled. The question is probably more one of publicity than actual education. Your attention is called to the committee announcement which appears in this issue.

Next year, too, will doubtless furnish new legislative problems which will require committee activity.

The statute of limitations after being reduced to two years in North Dakota by one legislature was later changed back to six years by the next legislature. From this we may gather what to expect in Minnesota not only next year but at each legislative session.

It is important that every component society appoint and instruct its delegates and that each delegate realize his responsibility and see to it that his society is represented.

Standardization

In 1921 Mr. Hoover established a unit in the Department of Commerce, of which he is secretary, called the Division of Simplified Practice. Its purpose is the simplification in the manufacture, distribution and consumption of commodities in general. The use of a needless variety of shapes and sizes of commodities is an extravagance, not only in production but in distribution, replacement and even in consumption; and the public ultimately pays the bill.

The department renders its assistance and approval whenever 80 per cent of the manufacturers and consumers agree upon desirable specifications. The stipulations are recommended and published in pamphlet form by the Government printing office, but are in no way obligatory. Provision is made for revision yearly by standing committees representing manufacturers, distributors and consumers.

Largely through the efforts of the Committee on Simplification and Standardization of the American Hospital Association, of which Miss

Margaret Rogers, superintendent of St. Luke's Hospital, Saint Paul, is chairman, hospital beds, china, and, according to a recent bulletin, hospital bedding, have now been standardized by the Washington Bureau. The saving to hospitals throughout the country simply in these few items will amount to thousands of dollars. Other hospital supplies such as hospital plumbing fixtures, clinical thermometers, surgical dressings, etc., will probably be added in the near future.

Germany has been one of the leaders in the simplification through standardization of commodities in general. It has been said on good authority that her standardization methods developed before the World War did much towards enabling her to continue the war as long as she did.

On the other hand it is well recognized that extravagance has characterized the management of American enterprise in general—undoubtedly because heretofore certain economies were not so essential. As our country reaches out for world markets, however, every sort of economy will have to be practiced.

As is to be expected standardization in German hospitals has been far ahead of that in our country. There is little in a German hospital in fact that has not been standardized by the Bureau of the government.

We cannot refrain from calling attention at this time to the desirability of using the metric system in this standardization work. Our country will eventually have to adopt the simpler and more universal metric system, and perhaps it is not being too fantastic to predict our eventual adoption of the twenty-four hour nomenclature (dropping the A. M. and P. M. designation) and the adoption of thirteen months of four weeks each instead of our inconvenient present calendar—all in the interests of simplification.

Twelve Months of the Basic Science Law in Minnesota

The Basic Science law has been in operation in Minnesota twelve months.

During this period no chiropractor has appeared before the Board for examination. Since the enactment of this law the number of chiropractic schools in the state has been reduced from three to one.

Four osteopaths have taken the Basic Science Board examinations and three have been granted certificates.

Board certificates on the basis of previous licensure have so far been issued to 3,231 physicians, 189 osteopaths and 493 chiropractors. A total of 253 have obtained certificates by examination.

Some caustic criticisms of Basic Science laws in general have recently been expressed and published. The main cause of complaint is that all chiropractors and osteopaths legally practicing at the time the law became effective are granted certificates without examination. The critic appears densely ignorant of the principle of the law that applies in this case, namely, that any such retroactive legislation which would take away rights previously granted by due process of law would be illegal.

What is being accomplished in our state is the requiring of a better educational foundation for those who in the future shall be legally entitled to treat the sick.

The same critic above mentioned assumes that passing the Basic Science Board examination is a mere matter of form. When one considers the personnel of our Board such an assumption is laughable.

The questions asked by the Board at the April 3 examination are appended for the benefit of any who might be inclined to agree with the critic referred to.

F. J. SAVAGE, M.D.

BASIC SCIENCE EXAMINATION—APRIL 3, 1928.

Bacteriology

1. Explain how you would differentiate streptococci from staphylococci by bacteriologic methods.
 2. Explain how you would make a bacteriologic examination of the spinal fluid in a case of suspected meningitis.
 3. Describe briefly the technic of the Wassermann reaction and name the conditions in which a syphilitic may give a negative reaction.
 4. Explain in detail the methods for determining the presence of tubercle bacilli in (a) sputum, (b) peritoneal fluid.
 5. How are the following infections disseminated: malaria, trypanosomiasis, yellow fever, typhus fever.
- (Answer any three questions only.)

Hygiene

1. Discuss the procedures you would use in practice to prevent the spread of tuberculosis.
2. Name the pathogenic organisms that may be found

in sewage and discuss methods for the disposal of sewage.

3. Discuss methods for purifying the water supply of a city in the event that the water must be supplied from a river.

(Answer any one question only.)

Pathology

1. Describe fully four different pathologic conditions that may give rise to a hemiplegia.
2. Describe fully the tumors of the bladder.
3. Name all the diseases that may cause enlargement of the spleen and describe the histologic structure of the spleen in any one type.
4. Discuss the causes of fatty degeneration.
5. Discuss the structural and functional changes in the liver and kidney in chronic passive congestion.
6. Name the different diseases that may cause a marked unilateral enlargement of (a) the cervical lymph-nodes in a man 50 years old, (b) the axillary nodes in a woman 40 years old, (c) the inguinal nodes in a man 21 years old. Arrange these in the order of their frequency.
7. What are the usual postmortem findings in a person dead of pernicious anemia (gross and microscopic)?

(Answer any four questions only.)

Physiology

1. Discuss the mechanism of spinal reflexes, and give the main causes of their exaggeration and depression.
2. Discuss the maintenance of equilibrium.
3. Discuss the regulation of blood pressure.
4. Discuss the formation and excretion of bile.
5. Discuss the regulation of the temperature of the body.
6. Discuss the secretion of gastric juice.
7. Discuss hypoglycemia and hyperglycemia.
8. Discuss the nervous mechanisms concerned in urination.

(Answer any four questions only.)

COMMUNICATION

North St. Paul, Minnesota,

March 23, 1928.

To the Editor:

For several years past there have been noted cases of Chickenpox following Herpes Zoster, or *vice versa*. Most of the references to these occurrences have been European.

On March 2, 1928, Mr. B. developed a well-marked case of Herpes Zoster involving the left pectoral region. On March 16, his only child, a boy of fourteen, came down with an unmistakable case of Varicella. As there was no other case of this disease in this town of 3,000 people at that time, and as diligent inquiry failed to find any exposure anywhere else, it is fair to assume that there was more than a coincident relation between the Herpes Zoster and the Chickenpox.

You may care to publish this report.

Yours very truly,

ERNEST W. COWERN, M.D.

THE COMMITTEE ON PUBLIC HEALTH EDUCATION

Minnesota State Medical Association

At the April meeting of the State Committee on Public Health Education the proposed program was reviewed and it was decided that the following objectives of the Committee should be continued:

OBJECTIVES

1. The small group discussion, or so-called Socratic method of evaluating the present attitude of the profession on the question of their relations as individual doctors to the public.
2. Unifying in some measure the wide variance of existing individual opinion.
3. Proceeding cautiously, releasing nothing to the public that has not been thoroughly discussed and that has not had the approval of the majority of the medical profession.
4. Encouraging the individual doctor as a practicing physician to be the exponent of public health education.
5. Encouraging groups such as hospital staffs to study the questions of their relations to the public.
6. Coöperating as far as requested with the component medical societies in their respective public health education programs.

We know that members of the State Medical Association, because of their training, are the natural leaders in health problems.

The Primer, prepared by the committee, has now been published. Some two hundred members have participated in its making.

The State Committee suggests for its second study questions confronting the local medical societies. Suggestions as to the following questions, their scope, and the proposed program are requested, and should be sent to the Secretary's office, 11 West Summit Avenue, Saint Paul, Minnesota.

YOUR LOCAL SOCIETY

1. *Do you discuss medical economic questions and relations to the public at your medical meetings?*
 2. *What relations has your local society established with the newspapers in your community?*
 3. *To what degree have your members addressed lay organizations on medical subjects?*
 4. *What relations has your local society established with lay organizations?*
 5. *What is the attitude of your society toward doctors participating in politics; for instance, as members of the legislature, the school board, welfare boards, et cetera?*
 6. *What study has your society made on the question of State Medicine?*
 7. *What principles of ethics has your organization decided upon?*
 8. *Has your society made any study of contract and compensation practice?*
 9. *In your local area, what percentage of the doctors are members of the State Association? What percentage of your members have a record for satisfactory professional conduct and ability?*
- Remember that the State membership is based entirely upon the membership of the county society.*
10. *What help is your local society rendering in the control of illegal practice?*
 11. *Has your organization sought to properly influence the administration of free clinics and welfare work?*
 12. *What is the outstanding action that your society has taken to solve these questions?*
 13. *Will you help by answering, criticising, and making additions to the above questions?*

The foundation of the program suggested is that the individual physician is the key to the question of public health education. His knowledge of health, preventive medicine, and disease marks him as a leader in the minds of his patients and the community.

The relation existing between the Minnesota State Medical Association and the public is that existing between the individual doctor and the public.

MISCELLANEOUS

MEDICAL MALPRACTICE SUITS*

CZAR JOHNSON, M.D., F.A.C.S.
Lincoln, Nebraska
(First Paper)

A suit for damages for alleged malpractice is a spectre which the doctor has never been able to accept with equanimity.

Notwithstanding that great scientific progress has been made in the field of preventive medicine, I have been unable to find any organized educational program for the prevention of alleged malpractice. The well established doctrine that testifying against a brother physician is a fraternal and ethical misdemeanor, and weekly abstracts of court decisions bearing upon the subject of malpractice published by medical journals, are post-mortem examinations rather than preventive medicine. In a majority of states medical defense committees assist in some capacity in the defense of malpractice suits.

The creation of State Medical Defense Committees marked a radical departure from long established customs of the medical profession and added to scientific and purely professional activities, sociologic and economic problems. I assume that the purpose of the defense committees, as conceived and instituted by organized medicine, was mutual protection and assistance in the event of unavoidable misfortune from unwarranted prosecution for alleged negligence or malpractice instigated by malicious, ignorant or selfish individuals. I assume that experience had taught those who were instrumental in the foundation of medical defense committees that the public is frequently careless in its acts and speech, often indifferent to medical problems, and that it, and also the medical profession, may harbor individuals who are malicious or avaricious. If my assumptions are correct, there is a legitimate reason for the existence of these committees. If there is a good reason for their existence there is an equally good reason for maximum efficiency without loss of the attributes of the profession.

In the past, so far as I have been able to learn, active defense of malpractice suits has been the only function of these committees. I admit the necessity of efficient defense, but here, as elsewhere, an ounce of prevention is better than a pound of cure.

The causation of suits for malpractice may be placed in one or more of the following classes:

- 1.—Malicious; either personal or professional, for personal, professional or financial gain.
- 2.—Circumstantial; wherein a combination of circumstances, misunderstanding or perversity of physical laws or the laws of health are contributing factors.
- 3.—Comparative; wherein both the physician and the patient contribute through carelessness, ignorance, indifference, misunderstanding or physical imbalance.

*The second of a series of three articles on this subject by Dr. Johnson will appear in the June issue.

4.—Judgment; wherein the elements of the case are materially the result of the judgment used by the physician, who is not infallible.

5.—Inexcusable; where, because of incompetence, negligence, indifference or unwarranted treatment, disaster results.

The laws of all states governing malpractice provide reasonable protection, and the courts have never required the impossible, nor more care and attention than is the custom in the locality in which the physician practices.

Sometimes it is difficult to determine the prevailing custom. This lack of definiteness, when it exists, is an open invitation to malpractice suits and a most serious condition in the face of legal difficulties.

This, I think, presents our present status and my own theory of the properties incident thereto.

PREVENTING MALPRACTICE SUITS

I now invite your consideration of the feasibility of methods calculated, not to defeat actions instituted, but to *discourage* and *prevent* their institution.

1.—The unit of value is the doctor. Physicians, individually and collectively, should have a working knowledge of the legal phases and acts that are free from liability; acts that are liabilities; and those that are borderline liabilities.

2.—*Written records* of clinical history, physical and laboratory examination, treatment and charges should be the inflexible rule. This does not require a voluminous document. Precise, accurate notes take but little time and space and are extremely valuable. The practice develops accuracy and concentration, prevents neglect and omissions, acts as a barometer in the treatment, has an excellent psychological effect, and is a *sheet anchor in malpractice suits*.

3.—Consultations are a protection. They distribute responsibility, prevent mistakes and omissions, develop *esprit de corps* and prevent malpractice suits.

4.—A reasonable, standardized obstetrical and surgical technic; treatment of fractures; use of electrical apparatus; intravenous and new and unofficial drugs; new and unofficial diagnostic reagents and the therapy of infectious diseases should be adopted in each locality. I appreciate that this will, to a limited degree, interfere with personal initiative; however, it will at the same time safeguard the public and the profession, which is more important.

A physician who is unwilling to accept guidance or conform to established conventions has no moral right to expect or receive collective assistance, and I doubt that the medical profession has the right to risk its reputation or spend money to defend such an individual.

5.—The medical profession has been unable to escape the problem of economics. Disproportionate and non-uniform fees for apparently the same relative value of work and excessive fees for incompetent work cause, in many instances, dissatisfaction, and are frequently the primary cause of malpractice suits.

6.—Demoralizing credit extension has become a serious problem. The practice of charging the rich an

excessive fee on the pretext of being able thereby to render service to the poor is not charity and is too often the source of legal difficulties. It is a hybrid form of business. The terms rich and poor are relative and often vague. In actual practice the custom resolves itself into charging the individual who is thrifty and pays his obligations promptly an excess fee, in order to be able to render service for those who will pay the butcher, garage, gas station and movie theatre but who never acquire the moral or financial integrity to include the doctor. On the other hand, deserving charity should never be eliminated from the profession and can always be given without material loss.

There are many details in the prevention of malpractice that could with profit be added to a prevention program. I have endeavored to show in a general way that this phase of medical practice is deserving of more study and attention than has been accorded it in the past. If I succeed in irritating a sufficient number of physicians to stir up a prevention program, I will have, in Army parlance, "accomplished my mission."

STATE BOARD OF MEDICAL EXAMINERS

The State Board of Medical Examiners was responsible for the arrest and conviction of one Peter J. Stolorow, licensed as a chiropractor and having an office in the Hamm Building, Saint Paul, on the charge of having performed an illegal operation, which resulted in the death, March 15, 1928, of a young girl who lived in Saint Paul.

It was through the efforts of the Board that the brother of the unfortunate victim filed two complaints against the defendant, the one charging him with the crime of manslaughter, the other with having performed the illegal operation. Through the county attorney's office the defendant was arrested, lodged in jail, tried and convicted of the charge of performing an illegal operation, to which charge he pleaded guilty. The sentence was four years in the penitentiary.

ABSORPTION OF INSULIN FROM THE ALIMENTARY TRACT

In recent experiments advantage has been taken of the antitryptic affect of blood serum to protect insulin given by oral paths from pancreatic digestive destruction.* Observations on a series of depancreatized dogs prove that insulin protected by blood serum from the proteolytic destruction of the digestive enzymes can be absorbed in significant amounts from the alimentary tract. While the experiments are promising, this is not the story of a completely dependable method of oral therapy; the results do not establish the usefulness of the host of proprietary insulin substitutes proposed for oral use. (Jour. A. M. A., March 24, 1928, p. 985.)

OBITUARY

Dr. John Grosvenor Cross*

John Grosvenor Cross, a trustee of the Hennepin County Medical Society, died at Abbott Hospital, March 3, 1928, after a brief illness.

His father was Dr. Edwin C. Cross, a pioneer physician of Rochester, Minnesota, who came from Bradford, Vermont, with his wife in 1868, to make his home in the western world. John Grosvenor Cross was born May 8, 1870, and as he grew older attended the public schools of Rochester, and the University of Minnesota, from which he was graduated in 1892. His medical course was taken at Northwestern University, from which he obtained his degree in 1895. After this he practiced at Rochester for seven years and then went to Vienna, where he studied for two years, beginning in 1902.

Upon his return in 1904, he limited his work to internal medicine and began the practice which he carried on actively up to the time of his death.

In 1893 Dr. Cross was married to Frances Montgomery of Minneapolis, who, with two sons, Grosvenor M. and Roderic M. Cross, and a daughter, Louise, survives him.

Along with his medical practice, Dr. Cross was always ready to work earnestly on matters of medical education and organization. In 1916, he was president of the Hennepin County Medical Society and in 1917-18 of the Minnesota Academy of Medicine. He had been on the faculty of the University of Minnesota Medical School and chief of the medical division of the Minneapolis General Hospital. He was also a member of the Minnesota Society of Internal Medicine. A number of articles on medical topics have been furnished by his pen to the medical periodicals during his years of practice. Northwestern, Hillcrest, Abbott and St. Mary's Hospitals all were proud to have him on their staff lists.

He was a member of the Minneapolis Club, the Nu Sigma Nu and Chi Psi fraternities, and of St. Mark's Episcopal Church.

Dependable, earnest unflinching in his duty, unflinching in his industry, he has always been a force in this state and in this community working towards the building up of ideals and standards of medical excellence.

The following memorial to Dr. Cross was prepared for the medical staff at Abbott Hospital by Dr. A. T. Mann:

"In the passing of Dr. J. G. Cross we have lost one of the outstanding men in the profession. Always earnest, painstaking and sincere, he won the high regard of his fellows for the excellent quality of his work and the considerable mental capacity and the sagacity he brought to bear upon its numerous and perplexing

*Read before the Hennepin County Medical Society as a report of the Necrology Committee, April 2, 1928.

problems. He had a warm, broad sense of humor and a personal charm which endeared him greatly to those who came into close contact with him, both among his professional fellows and among his patients. His professional friends held him in high esteem as a man of honor and a man of worth. He made it a point never to speak ill of anyone. His circle of friends was wide and increased as the years rolled on. However, he had a mild reserve and a feeling of personal dignity which naturally tended to limit the number of those who knew him well, but among those he numbered lifelong friends.

"To his patients he was more than a physician. He showed an interest which touched their personality broadly, a human interest in them which endeared him greatly to large numbers of those who came to him in a busy practice.

"Born in Rochester, Minn., May 8, 1870, where he spent his childhood and youth, he returned there for the early years of his medical practice (1895-1902), after his graduation from the medical department of Northwestern University (1895), and then came to Minneapolis, where he soon began to make a place for himself, honored, respected and admired. He made a good beginning in his friendships while at the University of Minnesota, where he took a B.S. degree before studying medicine at Northwestern. As a member of the Chi Psi fraternity he was very happy and many of the fine friendships begun at this time have endured throughout his life.

"His professional life spans thirty-three years, seven at Rochester and twenty-six at Minneapolis. During this time he was a careful and fairly constant writer on subjects in the general field of medicine in which he was interested. 'Chronic Arterial Hypertension,' 'Causes and Care of Arterial Hypertension,' 'Notes on Heart Block' are among the titles of his most recent papers and 'Factors in Prognosis of Heart Disease' was just completed and ready for the printer three days before his death, March 3, 1928.

"Dr. Cross was a musician of considerable skill, an interested member of St. Mark's Church, and was on the Hospital Staff of the Abbott, Northwestern, Hillcrest, and St. Mary's Hospitals, and, at one time, the St. Barnabas and the City Hospitals, and the teaching staff of the University Medical School."

Dr. William M. Newhall

Dr. William M. Newhall, former Minneapolis physician and surgeon, who had practised in Hennepin county since 1886, died Tuesday, April 10, at his home, Crystal Bay, Lake Minnetonka, after an illness of several months. He was 71 years old.

Dr. Newhall was born in Claremont, Minn., and received his early education in that city. Later he attended the Pillsbury Academy at Owatonna and Columbia University in New York City. He was also a graduate of the Rush Medical College.

After finishing school in the East, he returned to Minnesota and began to practise medicine in Red Wing.

In 1886 he moved to Minneapolis and practised there until 1898, when he moved to Crystal Bay. Dr. Newhall was recognized as one of the leading physicians and surgeons of the Northwest.

He is survived by a daughter, Virginia Newhall, of Crystal Bay; a sister, Mrs. Ida E. Glasby of Minneapolis; and a brother, A. O. Newhall, Yakima, Wash.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

MINNESOTA HOSPITAL ASSOCIATION

Officers: President, Dr. E. S. Mariette, Superintendent Glen Lake Sanitarium, Oak Terrace; First Vice President, Mr. H. B. Smith, President Northern Pacific Beneficial Association, St. Paul; Second Vice President, Miss Susan Holmes, Superintendent Abbott Hospital, Minneapolis; Third Vice President, Sister Patricia, Superintendent St. Mary's Hospital, Duluth; Secretary-Treasurer, Donald C. Smelzer, M.D., Superintendent the Chas. T. Miller Hospital, St. Paul. Executive Committee: Miss Harriet Hartry, Superintendent St. Barnabas Hospital, Minneapolis; Mrs. Pease Rexford, Superintendent Northwestern Hospital, Minneapolis; Mr. James McNee, Superintendent St. Luke's Hospital, Duluth.

The following is the tentative program of the Minnesota Hospital Association's annual meeting, which is to be held at the Curtis Hotel, Minneapolis, May 28 and 29.

The first meeting will be at 10:30 a. m., Monday, May 28. There will be an invocation by a local minister (to be selected later), an address of welcome by the Mayor, and a response by Mr. H. J. Hartwick, Superintendent of the Mayo Clinic. Dr. W. C. Alvarez of Rochester will read a paper on "Dietetics from the Viewpoint of the Physician." This paper will be discussed by Miss Edith Ferber of Duluth and Miss Florence Smith of Rochester.

At 12:30 p. m. there will be a luncheon, which will be presided over by Mr. Joseph Norby, Superintendent of Fairview Hospital, Minneapolis, and the speaker will be Reverend Doctor Bryn-Jones of Minneapolis.

The first part of the afternoon session will be the business meeting, followed by a paper by Dr. J. A. Myers of Minneapolis on "Should the General Hospital accept Tuberculosis Cases?" Following this there will be an open forum conducted by Mr. J. J. Drummond, Manager of the Worrell Hospital, Rochester, at which questions pertaining to hospital problems in general will be discussed.

At 7 p. m. there will be the annual banquet, at which Dr. Ray R. Knight of Minneapolis will be toastmaster, and the speakers will be Mr. Frank Madden, who is known as "Officer Mulcahy" to the radio world; Dr. Bert Caldwell, Executive Secretary of the American Hospital Association, Chicago; and Dr. Charles Mayo of the Mayo Foundation.

On Tuesday morning Mr. J. F. Reynolds, General Manager of the Minnesota Compensation Rating

Bureau, will talk on hospital insurance, followed by an address by one of the local hospital trustees (whose name will be given later).

At 10 a. m. another open forum, at which hospital problems will be discussed, will be conducted by Miss Margaret Rogers, Superintendent of Saint Luke's Hospital, Saint Paul.

In the afternoon there will be a ride in a chartered bus, followed by an organized conducted tour of the Minneapolis hospitals. This will close the meeting.

AMERICAN ASSOCIATION FOR THE STUDY OF GOITER

The American Association for the Study of Goiter, consisting of internists, pathologists, radiologists, etc., as well as surgeons, will hold their fifth annual Conference on Goiter, in Denver, Colorado, June 18, 19 and 20.

Several men from foreign countries have signified their intention of attending. Professor Breitner of the Von Eiselberg Clinic, Vienna, and Professor Albert Kocher of Berne, Switzerland, have accepted places upon the program.

Addresses and discussions on Prophylaxis, Medical Treatment, Endemic Goiter and Cretinism from the Public Health Standpoint, are on the program for the first afternoon.

Pathology, various phases of Surgical Treatment, etc., will be considered the last two afternoons.

All members of State Medical Societies are invited to attend.

Dr. Gordon S. Fahrni of Winnipeg, Canada, is the President and Dr. Kerwin Kinard of Kansas City is Vice President.

AMERICAN PSYCHIATRIC ASSOCIATION

The eighty-fourth annual meeting of the American Psychiatric Association is to be held June 4, 5, 6, 7, and 8, at the Hotel Radisson, Minneapolis, Minnesota. The sessions begin at 10:00 a. m. and 2:00 p. m. daily. The annual address is to be given by Professor Roscoe Pound of the Harvard Law School at 8:30 p. m., Wednesday, June 6, and is to be followed by the President's reception.

Monday, June 4, will be devoted to the Section on Convulsive Disorders. Tuesday, June 5, will be given over to general sessions, including Convulsive Disorders and Mental Hygiene. Dr. Wm. J. Mayo of Rochester will give the address of welcome, Tuesday morning. Wednesday, June 6, is reserved for papers on Pathology; Thursday morning, June 7, for Clinical Psychiatry. The afternoon session will be shared with the American Psychoanalytic Association on Psychoanalysis. Round Table Conferences are to be held in the evening of Thursday. The final session on Friday morning, June 8, will be held in conjunction with the American Psychopathological Association on Psychopathology.

Sessions are open to those professionally interested. Sight-seeing and shopping tours, a complimentary

luncheon, and general entertainment are to be arranged for ladies accompanying members.

A one and one-half fare railroad rate has been granted on condition that two hundred fifty members and dependent relatives attend the meeting and obtain certificates. A ticket at regular one-way tariff fare to Minneapolis must be obtained from May 31 to June 6, inclusive. When tickets are purchased one must get a CERTIFICATE (not a receipt).

INTER-STATE POST GRADUATE MEDICAL ASSOCIATION

The 1928 tour abroad of the Inter-State Post Graduate Medical Association of North America will leave New York June 16, returning August 6. The party will be limited to one hundred and twenty-five and the blanket cost is \$995.00.

Besides a medical program on board ship, clinics will be held in the following European cities: Paris, Berne, Zurich, Munich, Vienna, Budapest, Prague and Berlin.

Further information may be obtained from Dr. W. B. Peck, Managing Director, Freeport, Illinois.

STEARNS-BENTON COUNTY MEDICAL SOCIETY

The Stearns-Benton County Medical Society met at the new St. Cloud Hospital Thursday evening, March 29, 1928. There were thirty-four members present.

PROGRAM

"Intestinal Obstruction"—Dr. R. N. Jones, St. Cloud.

Discussion: Dr. C. B. Lewis, St. Cloud; Dr. Clarence Jacobson, Kimball.

"Nephroses"—Dr. W. L. Freeman, St. Cloud.

Discussion: Dr. H. B. Clark, St. Cloud; Dr. August Kuhlman, Melrose.

"Infant Mortality During 1927" (in the city of St. Cloud)—Dr. W. B. Richards, St. Cloud.

Discussion: Dr. F. J. Schatz, St. Cloud; Dr. M. J. Kern, St. Cloud.

WEST CENTRAL MEDICAL SOCIETY

The regular meeting of the West Central Medical Society was held April 11 at Morris, Minnesota, following a dinner at the Merchants Hotel, at which members were the guests of Drs. John T. Leland, C. I. Oliver, B. M. Randall, N. F. Doleman and W. T. Judge.

The scientific program included the following papers:

"Rectal Examinations"—Dr. J. F. Cumming, Morris.

"The General Practitioner"—Dr. E. T. Fitzgerald, Morris.

Report on the secretaries' conference in Saint Paul—Dr. H. Linde, Cyrus.

WRIGHT COUNTY MEDICAL SOCIETY

A meeting devoted to medico-legal subjects presented by attorneys was held April 5 by the Wright

County Medical Society at the home of Dr. J. J. Catlin in Buffalo.

Mr. Anderson, Judge of Probate Court of Wright County, spoke on the subject of the disposition of a dead body from a legal standpoint. Mr. Welch, county attorney, spoke briefly on legal questions of interest to doctors, particularly with respect to the duties of the coroner. Mr. H. S. Whipple presented a paper on the question of malpractice suits. All three subjects evoked considerable discussion.

Dr. C. B. Wright, president of the State Association, and Dr. N. O. Pearce, chairman of the Committee on Medical Education, also addressed the society.

OF GENERAL INTEREST

Dr. William H. Rumpf, Jr., formerly of Saint Paul, is now located at 516 La Salle Building, Minneapolis.

Dr. Thomas Myers of Saint Paul is traveling in Europe and will visit the principal pediatric centers while there.

Dr. and Mrs. Robert Earl of Saint Paul have announced the engagement of their daughter, May, to James Slocum of Minneapolis.

The Minnesota State Board of Examiners in the Basic Sciences recently established reciprocity with the Wisconsin Basic Science Board.

Dr. A. E. Olson of Duluth has returned to his practice following a five months' trip abroad, where he did post-graduate study in the universities of Vienna and Budapest.

Dr. J. A. Myers of Minneapolis presented a paper before the Jackson County Medical Society of Kansas City, the evening of March 13. The subject was "Hospitalization for the Tuberculous."

Marcus Anderson, son of Dr. and Mrs. Arnt G. Anderson of Minneapolis, died March 24, as the result of an automobile accident in which his skull was fractured. He was but 19 years old.

Dr. Lee M. Miles has announced the opening of new offices at Suite 451, Lowry Medical Arts Building, Saint Paul, where he will continue his practice of obstetrics, surgery and female urology.

The marriage of Miss Margaret Schlutz, daughter of Dr. and Mrs. Frederic Schlutz of Minneapolis, to Dr. Harrison A. Tinker, son of Dr. and Mrs. E. T. Tinker of Minneapolis, was solemnized Saturday, March 31. Dr. and Mrs. Tinker will be at home after June 15 at 1433 West Thirty-first Street, Minneapolis.

An organization to be known as the Physicians' Service Bureau, membership in which is to be limited to

those enrolled in the Ramsey County Medical Society, Saint Paul, is in the process of formation to provide the local physicians with a credit bureau, collection agency and telephone exchange. The advisability of such an organization has become increasingly manifest and the completion of plans is the outcome of considerable discussion and planning for some months past. The Bureau expects to begin operations at once, the telephone service to be available July 1.

Physicians in the Twin Cities and Rochester had the opportunity to hear a real endocrinologist recently in the person of Professor Julius Bauer of Vienna. Brought to the Twin Cities through the efforts of the Minnesota Pathological Society and the Minneapolis and Saint Paul Clinical Clubs, Professor Bauer gave several interesting addresses on the present status of knowledge of the endocrine glands and conducted some valuable medical clinics. Professor Bauer's command of English was outstanding and the conservative limitation of his statements to proven facts was most satisfying.

Laws appropriating funds for the education of handicapped children have been enacted in a number of states and the interest in such classes is growing in communities throughout the country. As the demand for teachers with special training for this work is greater than the supply, training courses for the teachers of sight-saving classes are being offered at several universities. This summer the University of Cincinnati and the University of California will offer elementary courses for the training of sight-saving class teachers, and the University of Chicago will give an advanced course, the latter being limited to teachers who have had elementary training in this work.

Information concerning the courses may be had from the respective universities or from the National Society for the Prevention of Blindness, 370 Seventh Avenue, New York City.

BARBITAL ADDICTION

The wide use of hypnotic preparations by the public has brought new problems for solution. When a single practitioner can report a hundred cases of acute poisoning or chronic addiction with one of the newer hypnotic drugs, the situation is serious. Barbitol, introduced as veronal, has an increasing lay popularity for self administration. Its habit-forming propensities are sufficiently well recognized to merit the special designation of barbitolism or veronalism. A host of proprietary hypnotics now on the market may induce in greater or less degree the same result. Addiction to barbitol appears not to stop with the production of moderate euphoria. Judgment, orientation as to time, and insight are probably the most severely harmed of the psychic faculties and are the last to clear up in convalescence. The "safe" hypnotics may become menacing to the public welfare. (Jour. A. M. A., March 10, 1928, p. 769.)

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of February 8, 1928.

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, February 8, 1928. Dinner was served at 7 p. m. and the meeting was called to order at 8 p. m. by the President, Dr. John E. Hynes. There were 26 members and 1 visitor present.

The minutes of the January meeting were read and approved.

The program of the evening consisted of the following case reports:

DR. OSCAR OWRE (Minneapolis) reported three cases:

1. Papillary carcinoma of the kidney pelvis. M. H., woman, aged 75, had been treated for albuminuria the last two years. During the last six months she has had two or three attacks with blood in the urine and a dull ache and pain in the back on the right side. She had been on a rigid diet for a supposed Bright's disease. She was admitted at the Swedish Hospital for cystoscopic examination on Dec. 29, 1927. Cystoscopic examination showed a normal bladder. The right and left ureteral openings appear normal. The left ureter showed a swirl of clear urine with a good contraction. Blood appeared to dribble from the right meatus. Both ureters were catheterized. Blood could be made to flow from the right catheter only when syringed out with water. An indigo-carmin test, given intravenously, showed a hyperfunctioning kidney on the left and no color in twenty minutes from the right. A pyelogram of the right pelvis shows almost a complete filling defect of the pelvis, very much like the point of the small finger. There is a thin line of shadow-casting fluid taking the form of an irregular circle and a few traces in the inside of the circle. (X-ray shown and specimen displayed.) As you will see, this is a papillary carcinoma of the pelvis of the kidney. In the pelvis a large clot about the size of an indoor baseball was found. This clot was old and showed a great deal of fibrin and appears almost organized in places. The thin irregular circular films of shadow-casting fluid occupied the periphery of the clot and the inner surface of the dilated pelvis (hematonephrosis). The irregularity of the line is caused by numerous implants of the original papilloma situated in the pelvis. There was no difficulty in removing this kidney as there were no adhesions or infiltrations about it. The growth was entirely inside the pelvis. The kidney cortex was very thin and practically no secretory tissue remained. She has made a splendid recovery. However, the prognosis in these cases is looked upon as quite unfavorable. (P. S. X-rays of the entire body showed no metastases.)

2. Male, 62 years of age, referred by Dr. Baker, February 8, for examination. Hematuria following exertion. The patient noticed blood in the urine two years ago. No vesicle distress and no pain on either side of the back. Urination was not frequent and the patient

did not have to urinate at night. He noticed, however, that at times he could pass as much as a quart of urine. The prostate felt small on rectal examination. On passing the cystoscope 16 ounces of bloody residual urine was removed. The bladder mucosa appears non-inflammatory. The left ureter was normal and the contraction and spurts of urine indicated a hyperfunctioning kidney. The right looked less active. There was no enlargement of the prostate intravesically. Just back of the right ureter and on the lateral wall of the fundus could be seen the orifice of a diverticulum. Bloody fluid could be seen coming from the orifice. By further distention of the bladder and altering the position of the cystoscope, it was possible to see, just inside of the orifice, some foreign matter which was not stone but had the appearance of tumor tissue. An indigo-carmin test showed a good color in one and one-half minutes from the left, and a fair color in eight minutes from the right ureteral opening. It is important to know that there is no communication between the ureter and the diverticulum (no blue color was seen coming from the orifice of the diverticulum); however, a shadow-casting catheter was passed to the kidney on the right side and another was coiled up in the diverticulum. An x-ray shows that they do not lie in contact with each other. The cystoscope was removed, leaving the bladder moderately distended. Two and one-half ounces of a 33½ per cent solution of sodium iodide was injected through the ureteral catheter into the diverticulum. Some of this will naturally escape into the distending medium of the bladder but there will be a disparity in the density or concentration of the fluid in the diverticulum and the bladder. (X-ray plates shown.) Here are two sacs almost of equal size with a defect in the filling of the diverticulum on the lower and lateral surface, demonstrating a tumor in the diverticulum and the source of the hematuria.

3. J. B., male, aged 36, referred by Dr. Arnold, February 8, 1928. The patient gave a history of having passed six ureteral stones on an average of once a year. This was always accompanied with a great deal of discomfort and pain, principally in the region of the right kidney. A complete x-ray plate showed no evidence of calculi in the genito-urinary tract. He was at present free from pain. The cystoscopic picture was that of a normal bladder, perhaps some redness about the right ureteral meatus. The right ureter showed very little action and a thin fluid was seen to dribble from the same. The left showed an over-active kidney. Indigo-carmin showed very promptly from the left and no color from the right in twenty-five minutes. A pyelogram of the right kidney displayed an unusual elongated renal pelvis and a hydro-ureter for a very short distance and then a very marked kink or crochet-hook ureter. The picture suggests, with little doubt, that of a kink produced by an anomalous or adventitious vessel.

DISCUSSION

DR. A. SCHWYZER (St. Paul): This was indeed a very splendid clinic. In the first case, you can readily see how the affected side would only dribble, and the

urine would hardly get by the enormous blood clot at all. The tumor is, of course, carcinoma; it has a very broad base; in fact it comprises half the surface of the cavity. These tumors are rare. I showed you one papillomatous carcinoma some time ago where the tumor was in the pelvis of the kidney and was about the size of an egg yolk and had a reasonably small base. Nevertheless it was a papillary carcinoma. The diagnosis from the x-ray picture as Dr. Owre has developed it is simply beautiful.

In regard to the second case, the diverticulum of the bladder, its demonstration was as pretty as anything one can see in this line. First seeing the tumor in the diverticulum with the cystoscope then showing it on the screen. It just shows what can be done if the case is in expert hands. The coiling up of the catheter in the diverticulum, and especially the injection of the strong contrast solution into the diverticulum, with its gradual permeation into the water-filled bladder, appeals to one very much. Was the right ureter in the diverticulum?

DR. OWRE: No, that was independent. We had to demonstrate that because that is an important point.

DR. SCHWYZER: I agree with Dr. Owre, in the second case, that he had to deal with a congenitally defective kidney where a plastic in the uretero-pelvic junction would not do any good.

DR. WM. LERCHE (St. Paul): I have used the method of injecting two fluids of different densities for roentgenographic demonstration of diverticula of the bladder. The contrivance described by me in the *Annals of Surgery*, February, 1912 (a small rubber bag tied to a ureteral catheter), is introduced into the diverticulum, by the aid of the cystoscope. A fluid of greater density than that already filling the bladder is slowly injected into the bag in the diverticulum, and, as this fluid distends the bag, the fluid of lesser density present in the diverticulum is gradually forced into the bladder.

For smaller diverticula I have devised another method, by which, with the aid of a double catheter to which is attached a small sausage-shaped bag, the opening into the diverticulum can be closed and the latter filled with fluid of desired density.

DR. OWRE (in closing): In children and young adults, without severe infection, it is very important to ligate the adventitious vessel and try to conserve the kidney. In this case the kidney was so bad that I advised its removal. As regards the removal of the diverticulum, a very good plan is of course a wide exposure and then pack the cavity of the sac through the orifice with gauze until it is full. It can then be dissected out more easily.

At this time it may not be out of place to speak about the advisability of cystoscopy in cases of enlarged prostate. I believe, if the cystoscope can be easily inserted and without force or injury, it should be done. In cases of diverticula it often becomes necessary to resect them later even though the prostate has been removed. Further we often find, associated with adenoma of the prostate, foreign bodies, stones, and

papillary carcinoma of the bladder. One case of diverticulum that I recall was a man in the care of the late Dr. Ringnell. He removed a large adenomatous prostate and after the suprapubic wound healed the patient still had 500 c.c. of foul residual urine. He was to come under my care but went to Dr. Bransford Lewis, who found a large diverticulum which he removed with complete recovery. The urine was not foul before the prostatectomy and the orifice could no doubt have been seen had he been cystoscoped. This is an argument for cystoscopy before prostatectomy. I could cite many others. Many seemingly large diverticula will drain after the prostate has been removed; others will not. It guards the prognosis if we have previously examined the bladder.

DR. F. W. SCHLUTZ (Minneapolis) reported the following case:

The case concerns a baby girl who was admitted to the University Hospital when she was two and one-half months old for the treatment of malnutrition and some chest condition. The birth was normal and at term. Some respiratory difficulty developed shortly after birth and was more or less continuous up to admission of the baby. This was frequently accompanied by cyanosis. Breathing was constantly rapid. There was no hyperpyrexia. In spite of regular and adequate breast-feeding, the baby showed steady decline in weight and presented considerable malnutrition and great weakness at the time of admission. An x-ray examination taken shortly before showed some ill-defined abnormal chest condition in the form of a density or shadow involving almost the entire right lung. Atelectasis was thought of. Other pathological conditions, such as chylothorax, tuberculosis, tumor, diaphragmatic hernia, etc., were considered. Careful examination ruled out all these conditions. A thoracentesis yielded about 50 c.c. of a limpid viscid fluid free from fat and cellular elements but with a high content of albumin. Removal of this fluid gave temporary relief. At subsequent aspirations as much as 20 c.c. of such fluid was removed. The rapid filling up of the cavity indicated a cyst not connecting with the bronchi.

X-ray pictures taken before and after injection with sodium iodide confirmed this and showed the cyst to be intraplmonary. The constant filling of the cavity with the resulting embarrassment of respiration and disturbance of the nutrition suggested the advisability of closed, continuous drainage. This was accomplished by the use of a trochar and the usual operative procedure. Several blood transfusions were given to improve the infant's general condition.

The cavity was irrigated at first with saline solution; then with Dakin's solution, and finally with a 0.5 per cent to 1 per cent formalin solution. This procedure was carried out twice daily. After a period of about two months of this treatment the cavity had decreased considerably in size and would hold only between 5 and 8 c.c. of fluid. The child's general condition had improved remarkably. There was no respiratory difficulty, and very good gain in weight.

On account of the probable bronchogenic nature of the cyst and the possibility of the presence of other cysts connecting with the bronchi, a bronchoscopy with injection of lipiodol was considered. This procedure was carried out and, while successful, was attended by fatal consequences about forty hours after the operation. Death seemed to be due to shock and collapse.

A limited autopsy on the chest showed the presence of an intrapulmonary cyst of the lower part of the right lung, walled off by dense masses of fibrous tissue. There was considerable lipiodol in both bronchi and complete gross absence of acute pulmonary inflammation.

DISCUSSION

DR. A. SCHWYZER (St. Paul): This case is pretty difficult to diagnose. It had been five months since the first puncture was made. From the first picture it looked as though the pleura was free. It is known that we sometimes have very large dermoids, but it was not a dermoid. Apparently it was a thin-walled cyst in the beginning, containing slimy fluid. What could that be? There is one condition that comes to my mind and that would be a cyst of the mediastinum or a thymus cyst. The thymus apart from a rudimentary anlage at the fourth branchial pouch comes from the third branchial pouch and from there travels down into the chest. Kuersteiner, in Bern, had made serial sections of the whole neck of newborn babies along that tract and he found little remnants of thymus along the tract and at times some little cysts. When we have a cyst behind the sternum, the thymus cyst is the most probable. A few years ago I saw one of those cysts that ran down behind the sternum. It was of considerable size. From the picture I would not say this was not a thymus cyst.

DR. WM. LERCHE (St. Paul): I agree with Dr. Schlutz and Dr. Schwyzer that there was no indication for bronchoscopy in this case. I have not seen reported a cyst of the lung of such a size as the roentgenogram indicates in Dr. Schlutz's case, but there have been several cases of multiple cysts of the lungs reported. I would like to know if the cyst was entirely surrounded by lung tissue.

DR. H. L. ULRICH (Minneapolis): In regard to the thymus, I think that was probably the origin of the cyst in this case.

DR. SCHLUTZ (in closing): The thymus was found intact at autopsy in this case; but that would not necessarily mean that this cyst did not have any connection with the thymus. In my opinion, bronchogenic origin would seem more likely. Analysis of the mass has not yet been made. I have never seen a similar case. I am quite certain that the bronchoscopy was an ill-advised procedure.

DR. J. F. HAMMOND (St. Paul) reported two cases:

1. Miss W., age 17, was operated upon Feb. 17, 1923. There was a double pyosalpinx with tubo-ovarian abscess in the left side. The mass in the left side extended up to the brim of the pelvis. Both tubes were removed; a portion of the left ovary was re-

sected, and a wedge-shaped piece of the uterus was removed by the Blair-Bell method. The right ovary was left intact. The patient left the hospital apparently well in about three weeks.

On July 28, 1926, the patient was re-admitted to the hospital with a nodule in the lower end of the old scar in the abdomen, which was about the size of a walnut. The mass was a dark red color, was quite fixed and seemed to be attached deep in the abdominal wall. It was not tender. There was some serum about the edges.

The patient stated she first noticed a small nodule appearing in the scar about six months after the operation; otherwise she had been quite well. The mass enlarged very slowly and was sore during each menstrual period. Finally, for the last year there was a discharge of blood from the scar with each menstrual period. In other respects the patient was quite well.

The patient was operated upon July 30, 1926. The scar with the mass was dissected out. It was found to extend through the abdominal wall and appeared to be attached to the right ovary. There were some loops of small intestine firmly adherent to the mass. A portion of the ovary was removed with the mass. There was some difficulty in closing the abdomen as the fascia was excised with the mass rather widely. The wound healed perfectly and the patient made an uneventful recovery.

The patient left the city after her last operation but reported when visiting here in August, 1927. She stated that she felt very well. She menstruates regularly every four weeks; the flow was moderate in amount and lasted three days. She had no pain. On examination the pelvis was in good condition. The stump of the uterus was well up, freely movable, and there was no tenderness.

The microscopic diagnosis was adenoma of the endometrial type. It is quite probable that this ectopic endometrial tissue can be accounted for by the excision of the top of the fundus. The endometrium may have become directly implanted in the wound or may have become implant on the ovary and developed from there by continuity. There was no evidence of a chocolate cyst or endometriosis of the right ovary at the previous operation. In this particular case there are other possible modes of development of the endometrium but the direct transplant is the most likely.

2. The second case was that of a woman 45 years old. She complained of a lump which was situated in the lower end of an old appendectomy scar. She had had her appendix removed twelve years before in another city. Judging from the scar, a split-muscle incision was used. She was told her appendix had ruptured on the way to the hospital and that the appendix and the right ovary, which were gangrenous, had been removed. The patient recovered without any particular difficulty. On account of some menstrual disturbance and pelvic distress, the patient was again operated upon in a St. Paul hospital on July 30, 1926. This time she was told she had a tumor the size of an orange. The record of this last operation was seen by me. A low

midline incision was made and a fibroid the size of a walnut was found on the anterior surface of the uterus and was removed. The uterus was recorded as being twice its normal size.

This patient first came under my observation January 29, 1928. She stated that the lump was first noticed in September, 1927. It gradually increased in size and lately turned black and bled at times. She stated it was painful at each menstrual period. Her menstruations had been increasing in amount during the last year. She had some pelvic discomfort, which also was increasing during the last year.

On examination there was a dark colored nodule about the size of a hazel-nut in the lower right quadrant of the abdomen. It was cystic, quite indurated about the edges, with no tenderness. It was fixed. On vaginal examination the cervix was found up under the symphysis, the fundus, the size of a three months' pregnant uterus, was quite hard and irregular in outline. There was some general pelvic tenderness. Nothing special was made out in the adnexa. Otherwise the history and examinations were negative.

An operation was performed on January 30, 1928, and the abdomen was opened by low midline incision. There were extensive adhesions in the pelvis; the uterus, which was detached from its anchorage on the left side, was adherent in the culdesac. There were two or three interstitial fibrous nodules; the left tube was gone; the left ovary was bound down behind the uterus; the right adnexa was gone except a small portion of what seemed to be the ovary, which was firmly adherent to the abdominal wall under the lower end of the old appendix scar. The uterus was amputated, and the left ovary removed. The old appendix scar with the nodules was dissected out with the remaining portion of the right adnexa. There were several fibroids found in the uterus, as the specimen shows.

Microscopical examination showed the nodules to be made up of endometrial tissue. The second or later operation probably had nothing to do with the development of this endometrioma. I think it is quite possible that she had a chocolate cyst in the right ovary rather than a gangrenous ovary at the time of the original operation and that this tumor developed from that source.

DR. ARNOLD SCHWYZER (St. Paul) reported two cases:

1. A case of thrombocytopenic purpura hemorrhagica.
2. Tumor of the cerebello-pontile angle (left side acoustic tumor). Operation under local anesthesia.

DISCUSSION

DR. SCHLUTZ (Minneapolis): I would like to ask Dr. Schwyzer whether the child showed any increase in blood platelets on the third or fourth day after the transfusion. It is reported that this change occurs in three or four days. In a recent issue of the

Wiener Archiv für Innere Medizin, Hugo Krasso of the Clinic of F. Kovács in Vienna reports some of these cases in which he had very excellent results with repeated massive transfusions. He contends that one can get almost the same results with massive transfusions that one can get with removal of the spleen. This statement was interesting to me because it is generally believed that one must remove the spleen to be really successful.

DR. ULRICH (Minneapolis): I want to make two comments on the first case. Personally I have never seen a case of primary thrombocytopenia in the male. I have seen it only in the female.

The second point I want to make is that there has been too much emphasis placed on the blood picture in these cases. There is also a capillary factor. Bleeding does not occur according to the law of how many thrombocytes there are in the blood. There is some other factor. We have a factor here of capillary disease which may go way back into the field of primitive reticula endothelial physiology.

DR. SCHWYZER: In answer to Dr. Schlutz, the most improvement in blood platelets was three days after the massive transfusion but only reached 33,000. Then it went down again. Right after the splenectomy the highest was 38,000, but two days afterwards it was only 26,000. The child was very much improved after that massive transfusion, although for the first twenty-four hours after the massive transfusion we were worried on account of the filling up of the bronchi with secretion. After that and until we did the splenectomy the child was in excellent shape. There was no marked change visible after the splenectomy, as she had already improved much after the massive transfusion, but we felt more safe about her. The child has remained in excellent condition since.

In reply to Dr. Ulrich, this patient was a girl. The capillary factor is emphasized by this case, as we had 70 minutes' bleeding time and only 6 minutes' coagulation time.

CARL B. DRAKE, M.D.,
Secretary.

GRAPEFRUIT AS A "PATENT MEDICINE"

In October 1927 the *Journal of the Michigan State Medical Society* printed an utterly preposterous article entitled "The Therapeutic Value of Hill Grown Grapefruit." Inadvertently, an abstract of this appeared in The Journal of the American Medical Association. There is not the slightest scientific evidence that any kind of grapefruit has any curative virtues in diabetes. The article mentioned vaunts the alleged potency of a special brand of grapefruit; it refers to the case of a Dr. Roy who has been exploiting himself in this connection for several years and now, apparently, it has led to a real-estate promotion and to the foundation of a sanatorium company by the Michigan physician. (Jour. A. M. A., March 3, 1928, p. 696.)

BOOK REVIEWS

Books listed here become the property of the Ramsey and Hennepin County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

TRIUMPHS OF MEDICINE. Henry Herzog, Jr. \$3.00. 310 pages. New York: Doubleday, Page and Co., 1927.

This book represents an attempt to give the history of medicine in simple language which can be understood and appreciated by the lay reader. In reality, it is a history of certain men and phases of medicine rather than an outline of the development of the whole. The choice of subjects is good, the language is simple and well adapted to anyone without knowledge of a medical vocabulary. The first chapter, on the separation of medicine from priestcraft, with the rise and fall of the barber surgeons, is well told and

will be of interest to anyone. Other chapters on anesthesia, vaccination, insulin and "instruments of precision" are comprehensive and complete, but many of the other chapters seem to be somewhat incomplete in that they deal only with the early history without the subsequent development. The history of anatomy, physiology, surgery, drug therapy and hospitals is discussed as well as the rôle played by microorganisms, infant mortality, preservation of teeth and "prevention."

The book is the chronicle of medicine told in hard, dry facts with all romance omitted, and to him who reads primarily for pleasure it will prove to be uninteresting, but to him who is seeking definite information expressed in simple language, it will be of great value. It should be known by physicians and recommended to their lay friends; it should be in every library and reading room and it should do much to make the general public understand the foundations and aims of the science of medicine. It therefore serves a definite purpose in the education of the laity.

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Counties—Brown, Big Stone, Chippewa, Lac Qui Parle, Lincoln, Lyon, Pope, Redwood, Stevens, Swift, Yellow Medicine

DISTRICT NO. 4

F. A. DODGE, M.D. Le Sueur

Counties—Blue Earth, Carver, LeSueur, McLeod, Nicollet, Renville, Scott, Sibley.

DISTRICT NO. 5

F. J. SAVAGE, M.D. Saint Paul

Counties—Chisago, Anoka, Dakota, Goodhue, Isanti, Ramsey, Rice, Washington.

DISTRICT NO. 6

W. H. CONDIT, M.D. Minneapolis

Counties—Hennepin, Kandiyohi, Meeker, Sherburne, Stearns, Wright.

DISTRICT NO. 7

W. W. WILL, M.D. Bertha

Counties—Beltrami, Benton, Cass, Clearwater, Crow Wing, Douglas, Hubbard, Mille Lacs, Morrison, Todd, Wadena.

DISTRICT NO. 8

G. S. WATTAM, M.D. Warren

Counties—Becker, Clay, Grant, Kittson, Lake of the Woods, Mahnomen, Marshall, Norman, Ottertail, Pennington, Polk, Red Lake, Roseau, Traverse, Wilkin.

DISTRICT NO. 9

W. A. COVENTRY, M.D. Duluth

Counties—Aitkin, Carlton, Cook, Itasca, Kanabec, Koochiching, Lake, Pine, St. Louis.

Minnesota State Medical Association

COUNTY SOCIETY ROSTER

BLUE EARTH COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of month.

Annual meeting, last Monday of year.

President
Schlesselman, J. T. Mankato

Secretary
Stillwell, W. C. Mankato

Andrews, J. W. Mankato
Andrews, R. N. Mankato
Arnold, James E. Mapleton
Benham, E. W. Mankato
Black, Wm. Mankato
Bomberger, C. B. Mapleton
Butzer, John A. Mankato

Cosgriff, J. A. North Mankato
Dahl, G. A. Mankato
Dally, H. H. Amboy
Denman, A. V. Mankato
Edwards, Ralph T. Elysian
Franchere, F. W. Lake Crystal
Fugina, George R. Mankato
Holbrook, J. S. Mankato
Holman, C. J. Mankato
Howard, M. I. Mankato
James, J. H. Mankato
Juliar, R. O. St. Clair
Kemp, A. F. Mankato

Liedloff, A. G. Mankato
Lloyd, H. J. Mankato
Macbeth, J. L. St. Clair
Miller, V. I. Mankato
Nolan, Lewis E. Vernon Center
O'Connor, Patrick H. Amboy
Osborn, Lida Mankato
Schield, E. L. Mankato
Schlesselman, J. T. Mankato
Schmidt, P. A. Good Thunder
Sohmer, A. E. Mankato
Stillwell, W. C. Mankato
Wentworth, A. J. Mankato

BLUE EARTH VALLEY MEDICAL SOCIETY

Regular meetings, fourth Thursday, May-October.

Annual meeting, May.

President
Butz, J. A. Monterey

Secretary
Hunt, R. C. Fairmont

Bailey, H. B. Ceylon
Best, F. E. Wells
Boysen, H. Welcome
Broberg, J. A. Blue Earth

Butz, J. A. Monterey
Chambers, W. C. Blue Earth
Cooper, M. D. Winnebago
Durgin, F. L. Winnebago
Farrish, R. C. Sherburn
Gardner, V. H. Fairmont
Henderson, A. J. Kiester
Holm, F. F. Wells
Hunt, F. N. Fairmont
Hunt, R. C. Fairmont

Hunte, A. F. Truman
Jacobs, A. C. Elmore
Johnson, H. P. Fairmont
Logan, F. W. Blue Earth
Luedtke, G. H. Fairmont
McGroarty, J. J. Easton
Marken, M. H. Fairmont
Mills, J. L. Winnebago
Richardson, W. J. Fairmont
Sybilrud, H. W. Bricelyn

CAMP RELEASE DISTRICT MEDICAL SOCIETY

Chippewa, Lac Qui Parle, Sibley, and Yellow Medicine Counties.

Regular meetings, quarterly.

Annual meeting, subject to call of President.

President
Passer, A. A. Olivia

Secretary
Holmberg, L. J. Canby

Adams, R. C. Bird Island
Aldrich, F. H. Belview
Bacon, R. S. Montevideo
Bergh, L. N. Montevideo
Brand, W. A. Redwood Falls
Burns, M. A. Milan
Cole, H. B. Redwood Falls
Cress, E. E. Boyd
Dordal, J. Sacred Heart
Duncan, Henry Marietta
Ericksen, L. G. Wood Lake

Farrell, J. C. Arlington
Flinn, B. P. Redwood Falls
Flinn, T. E. Redwood Falls
Flower, W. Z. Minneapolis
Foshager, Henry T. Clara City
Gaines, E. C. Buffalo Lake
Hassett, Roger G. Bird Island
Hauge, M. M. Clarkfield
Holmberg, L. J. Canby
Johnson, C. M. Dawson
Johnson, H. M. Dawson
Kaufman, A. J. Franklin
Kertesz, G. S. Arlington
Kilbride, J. S. Canby
Lee, Walter N. Madison
Lima, Ludvig Montevideo
Mee, P. H. Osseo

Mesker, G. H. Olivia
Mitchell, A. B. Hector
Nelson, M. S. Granite Falls
Nelson, N. A. Dawson
Olson, W. P. Gaylord
Orlob, W. M. Renville
Passer, A. A. Olivia
Paul, L. W. Canby
Penhall, F. W. Morton
Peterson, H. E. Granite Falls
Sanderson, A. G. Granite Falls
Sherman, H. T. Franklin
Smith, L. G. Montevideo
Stemsrud, A. A. Dawson
Tangen, Geo. M. Canby
Westby, Nels. Madison

CENTRAL MINNESOTA DISTRICT MEDICAL SOCIETY

Anoka, Isanti, Kanabec, Mille Lacs and Sherburne Counties.

Regular meetings, April and November.

Annual meeting, June.

President
Swenson, Charles Braham

Secretary
Cooney, H. C. Princeton
Caley, G. R. Princeton
Cooney, H. C. Princeton

Gates, C. E. Anoka
Hall, E. L. Princeton
Hedenstrom, L. H. Cambridge
Holm, C. E. Isle
March, Kenneth A. Isanti
Norrard, H. T. Milaca
Peterson, A. A. Mora

Roadman, I. M. Ponsford
Roehlke, A. B. Elk River
Stocking, Fred F. Milaca
Swennes, O. S. Wahkon
Swenson, Charles Braham
Vik, Melvin Onamia
Vrooman, F. E. St. Francis

CHISAGO-PINE COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.

Annual meeting, May.

Vice President
Callahan, F. F. Pokegama

Secretary
Kelsey, C. G. Hinckley
Callahan, F. F. Pokegama

Clark, D. M. Pine City
Dredge, H. P. Sandstone
Ehmke, Wm. C. Willow River
Flom, A. O. Chisago City
Freymler, E. F. Markville
Holmes, A. E. Rush City

Hultkrans, R. E. Rush City
Kelsey, C. G. Hinckley
Stephan, E. L. Hinckley
Stewart, R. I. Lindstrom
Stratte, A. K. Pine City
Stratte, Harold C. Pine City

†Application for Emeritus or Honorary membership not completed.

CLAY-BECKER COUNTY MEDICAL SOCIETY

Regular meetings, January, April, July and October.
Annual meeting, October.

President
Rutledge, L. H. Detroit Lakes
Secretary
Heimark, J. H. Moorhead
Aborn, W. H.† Hawley
Archibald, Frank M. Mahanomen

Bergheim, M. C. Hawley
Bottolfson, B. T. Moorhead
Carmen, J. E. Detroit Lakes
Ellingson, A. R. Detroit Lakes
Flancher, Leon H. Lake Park
Gosslee, G. L. Moorhead
Hagen, Olaf J. Moorhead
Heimark, J. H. Moorhead

Humphrey, E. W. Moorhead
Larsen, O. O. Detroit Lakes
Pardee, Katherine New York City
Rutledge, L. H. Detroit Lakes
Scott, R. A. Detroit Lakes
Simison, C. W. Hawley
Thornby, H. J. Moorhead
Thysell, F. A. Moorhead

DODGE COUNTY MEDICAL SOCIETY

Regular meetings, January, May and September.
Annual meeting, third Wednesday in September.

President
Harrison, E. E. West Concord
Secretary
Bigelow, C. E. Dodge Center

Adams, R. T. Mantorville
Affeldt, Daniel E. Kasson
Baker, Harry R. Hayfield
Bigelow, C. E. Dodge Center

Clifford, F. F. West Concord
Flores, O. T. Dodge Center
Harrison, E. E. West Concord
Smith, F. D. Kasson

FREEBORN COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.
Annual meeting, December.

President
Calhoun, F. W. Albert Lea
Secretary
Freligh, W. P. Albert Lea
Branham, D. S. Albert Lea
Burns, H. D. Albert Lea
Butturff, C. R. Freeborn

Calhoun, F. W. Albert Lea
Folken, F. G. Albert Lea
Freeman, J. P. Albert Lea
Freligh, W. P. Albert Lea
Gamble, J. W. Albert Lea
Gamble, P. M. Albert Lea
Gamble, R. M. Albert Lea
Gullixson, A. Albert Lea
Kaasa, L. J. Albert Lea

Kamp, B. A. Albert Lea
Kooiker, Herman J. Albert Lea
Nannestad, J. R. Albert Lea
Palmer, C. F. Albert Lea
Palmer, W. L. Albert Lea
Schultz, J. A. Albert Lea
Vollum, E. O. Albert Lea
Von Berg, J. P. Albert Lea

GOODHUE COUNTY MEDICAL SOCIETY

Annual meeting, February.

President
Steffens, L. A. Red Wing
Secretary
Anderson, S. H. Red Wing
Aanes, A. M. Red Wing

Anderson, S. H. Red Wing
Bjorgo, C. W. Cannon Falls
Claydon, L. E. Red Wing
Conley, Alvah A. Cannon Falls
Cremer, M. H. Red Wing
Dewey, G. W. Goodhue

Johnson, A. E. Red Wing
Jones, A. W. Red Wing
McGuigan, H. T. Red Wing
Sawyer, H. P. Goodhue
Smith, M. W. Red Wing
Steffens, L. A. Red Wing

HENNEPIN COUNTY MEDICAL SOCIETY

Regular meetings, first Monday of month.
Annual meeting, first Monday in January.

President
Hedback, A. E. Minneapolis
Secretary
Hansen, Erling Minneapolis
Adair, F. L. Minneapolis
Aling, C. P. Minneapolis
Allen, H. W. Minneapolis
Allison, R. G. Minneapolis
Almquist, H. E. Minneapolis
Altnow, Hugo O. Minneapolis
Anderson, A. E. Minneapolis
Anderson, Arnt G. Minneapolis
Anderson, David D. Minneapolis
Anderson, Edward D. Minneapolis
Anderson, Ernest R. Minneapolis
Anderson, Silas C. Minneapolis
Andrews, R. S. Minneapolis
Annis, H. B. Minneapolis
Arey, H. C. Excelsior
Armstrong, Harry G. Minneapolis
Arvidson, C. G. Minneapolis
Aune, Martin Minneapolis
Aurand, W. H. Minneapolis
Aurness, P. A. Minneapolis
Avery, J. Fowler Minneapolis
Baken, Melvin P. Minneapolis
Baker, Alfred T. Minneapolis
Baker, E. L. Minneapolis
Baker, Looe Minneapolis
Bakke, O. H. Minneapolis
Barber, J. P. Minneapolis
Barron, Moses Minneapolis
Barton, E. R. Minneapolis
Bass, G. W. Minneapolis
Baxter, S. H. Minneapolis
Beard, Archie H. Minneapolis
Beard, R. O. Minneapolis

Bedford, E. W. Minneapolis
Bell, E. T. Minneapolis
Bell, J. W., Sr. Minneapolis
Benedict, E. E. Minneapolis
Benjamin, A. E. Minneapolis
Benn, F. G. Minneapolis
Berglund, Hilding Minneapolis
Bessesen, A. N., Sr. Minneapolis
Bessesen, A. N., Jr. Minneapolis
Bessesen, Daniel H. Minneapolis
Bessesen, W. A. Minneapolis
Bishop, Chas. W. Minneapolis
Bissell, F. S. Minneapolis
Blake, Jas. Hopkins
Blaustone, Henry H. Minneapolis
Blumenthal, Jacob Minneapolis
Bockman, M. W. H. Minneapolis
Booth, A. E. Minneapolis
Boquist, E. T. W. Minneapolis
Boquist, Harold S. Minneapolis
Boreen, C. A. Minneapolis
Borgeson, Egbert J. Minneapolis
Bouman, H. A. Minneapolis
Bracken, H. M. Claremont, Calif.
Bratrud, A. F. Minneapolis
Brooks, Chas. N. Minneapolis
Brown, Edgar D. Minneapolis
Brown, Edw. J. Minneapolis
Bulkley, Kenneth Minneapolis
Burling, Temple Minneapolis
Butler, John Minneapolis
Byrnes, W. J. Minneapolis
Cabot, George S. Minneapolis
Cabot, V. S. Minneapolis
Callierstrom, G. W. Minneapolis
Camp, W. E. Minneapolis
Campbell, L. M. Minneapolis
Campbell, Robert Minneapolis
Cardle, Archibald E. Minneapolis

Carey, Jas. B. Minneapolis
Carlaw, C. M. Minneapolis
Caron, Robert P. Minneapolis
Chamberlain, H. E. Minneapolis
Chelen, S. J. Minneapolis
Cherry, Chas. H. Minneapolis
Chesley, A. J. Minneapolis
Cirkler, A. A. Minneapolis
Clark, H. S. Minneapolis
Condit, W. H. Minneapolis
Cook, Henry Wireman Minneapolis
Cooperman, H. O. Minneapolis
Corbett, J. Frank Minneapolis
Cosman, E. O. Minneapolis
Crafts, Leo M. Minneapolis
Cranmer, Richard R. Minneapolis
Creighton, Ralph H. Minneapolis
Curtin, John F. Minneapolis
Cutts, John F. Minneapolis
Dady, Elmer E. Minneapolis
Dahl, Elmer O. Minneapolis
Dahl, John A. Minneapolis
Dahlstrom, A. W. Minneapolis
Daniel, Donald H. Minneapolis
Daniel, Lewis M. Minneapolis
Dart, Leslie O. Minneapolis
Devereaux, T. G. Wayzata
Dezell, Earl R. Minneapolis
Deziel, G. Minneapolis
Diehl, Harold S. Minneapolis
Diessner, H. D. Minneapolis
Disen, C. F. Minneapolis
Donaldson, C. A.† Minneapolis
Dorge, Richard I. Minneapolis
Doxey, G. L. Minneapolis
Drake, C. R. Minneapolis
Dreisbach, N. Minneapolis
Dunlap, E. H. Minneapolis
Dunn, Geo. R. Minneapolis

†Application for Emeritus or Honorary membership not completed.

Dunn, Louis	Minneapolis	Irvine, H. G.	Minneapolis	Michael, J. C.	Minneapolis
Dunsmoor, F. A.	Minneapolis	Jackson, C. M.	Minneapolis	Michelson, H. E.	Minneapolis
Dutton, C. E.	Minneapolis	Jennings, Mary H.	Minneapolis	Miller, F. C.	Minneapolis
Dworsky, Samuel D.	Minneapolis	Jensen, Louis C.	Minneapolis	Moir, Wm.	Minneapolis
Eklund, Kristian	Minneapolis	Jensen, M. J.	Minneapolis	Monahan, R. H.	Minneapolis
Ehrenberg, C. J.	Minneapolis	Johnson, A. E.	Minneapolis	Moorhead, M. B.	Minneapolis
Eitel, Geo. D.	Minneapolis	Johnson, A. Elov	Minneapolis	Moren, Edwin	Minneapolis
Eitel, G. G.*	Minneapolis	Johnson, James A.	Minneapolis	Moriarty, Cecile R.	Minneapolis
Ellison, David E.	Minneapolis	Johnson, Julius	Minneapolis	Morrison, A. W.	Minneapolis
Erb, F. A.	Minneapolis	Johnson, Nimrod A.	Minneapolis	Murdock, A. J.	Minneapolis
Erdmann, C. A.	Minneapolis	Johnson, Norman	Minneapolis	Murphy, Ignatius	Minneapolis
Ericson, J.	Minneapolis	Johnson, Odin J.	Minneapolis	Murphy, Leo	Minneapolis
Evans, Edward T.	Minneapolis	Johnson, R. A.	Minneapolis	Myers, J. A.	Minneapolis
Everlof, J. L.	Minneapolis	Johnson, Selmer M.	Minneapolis	Nathanson, M. H.	Minneapolis
Fansler, W. A.	Minneapolis	Jones, G. M.	Minneapolis	Neal, J. M.	Minneapolis
Farabaugh, Charles L.	Minneapolis	Jones, H. W.	Minneapolis	Nelson, C. P.	Minneapolis
Farr, R. E.	Minneapolis	Jones, W. A.	Minneapolis	Nelson, H. S.	Minneapolis
Feeney, John M.	Minneapolis	Joseph, Alexander	Minneapolis	Nelson, O. E.	Minneapolis
Fink, Walter H.	Minneapolis	Kennedy, C. C.	Minneapolis	Newhart, Horace	Minneapolis
Fischer, G.	Minneapolis	Kennedy, Jane F.	Minneapolis	Nippert, L. A.	Minneapolis
Fitzgerald, D.	Minneapolis	Kennedy, R. Roy	Minneapolis	Nootnagel, C. F.	Minneapolis
Fjeldstad, C. A.	Minneapolis	Kibbe, O. A.	Minneapolis	Noran, A. N.	Minneapolis
Fjellman, R. C.	Minneapolis	Kimball, H. H.	Minneapolis	Nordin, G. T.	Minneapolis
Fleming, A. S.	Minneapolis	King, E. A.	Minneapolis	Nordland, Martin	Minneapolis
Foster, W. K.	Minneapolis	King, Harry T.	Minneapolis	Noth, H. W.	Minneapolis
Fowler, L. H.	Minneapolis	King, W. R.	Minneapolis	O'Donnell, J. E.	Minneapolis
Fox, John M.	Minneapolis	Kinsella, Thomas J.	Oak Terrace	Oberg, C. M.	Minneapolis
Friedell, A.	Minneapolis	Kistler, A. J.	Minneapolis	Olson, F. A.	Minneapolis
Frudenberg, H. H.	Minneapolis	Kistler, C. M.	Minneapolis	Olson, G. M.	Minneapolis
Funk, Victor K.	Oak Terrace	Knight, H. L.	Minneapolis	Olson, Olaf A.	Minneapolis
Gammell, J. H.	Minneapolis	Knight, Ralph T.	Minneapolis	Olson, R. G.	Minneapolis
Garand, J. H.	Dayton	Knight, Ray R.	Minneapolis	Owre, Oscar	Minneapolis
Gardner, Edwin L.	Minneapolis	Koch, John C.	Minneapolis	Parks, A. H.	Minneapolis
Gates, Russell	Minneapolis	Kohler, G. A.	Minneapolis	Patterson, W. E.	Minneapolis
Geist, Emil S.	Minneapolis	Koller, Herman M.	Minneapolis	Paulsen, E. L.	Minneapolis
Giere, E. O.	Minneapolis	Koller, L. R.	Minneapolis	Pearce, N. O.	Minneapolis
Giesler, Paul W.	Minneapolis	Kremer, Walter J.	Minneapolis	Pederson, Harold	Minneapolis
Gilles, F. L.	Minneapolis	Kriedland, Daniel	Minneapolis	Pederson, R. M.	Minneapolis
Gingold, Benjamin A.	Minneapolis	Kucera, Frank J.	Hopkins	Peppard, T. A.	Minneapolis
Goldberg, Isadore M.	Minneapolis	Kucera, Wm. J.	Minneapolis	Perry, Ralph St. J.	Minneapolis
Gordon, Geo. J.	Minneapolis	Kusske, A. L.	New Ulm	Peters, R. M.	Minneapolis
Gosin, D. F.	Minneapolis	Lajoie, John M.	Minneapolis	Petersen, J. R.	Minneapolis
Grave, Floyd	Minneapolis	Lapierre, A. P.	Minneapolis	Petersen, Thorvald	Minneapolis
Green, E. K.	Minneapolis	Lapierre, C. A.	Minneapolis	Peterson, O. H.	Minneapolis
Greene, W. F.	Minneapolis	Larson, Clarence M.	Minneapolis	Peterson, Willard C.	Minneapolis
Greisheimer, Esther M.	Minneapolis	Laurent, A. A.	Minneapolis	Pettit, L. J.	Minneapolis
Gunderson, Nels A.	Minneapolis	LaVake, R. T.	Minneapolis	Petter, Charles K.	Oak Terrace
Hacking, Frank H.	Minneapolis	Law, A. A.	Minneapolis	Pettit, C. W.	Minneapolis
Hagen, G. L.	Minneapolis	Lazar, H. L.	Minneapolis	Phelps, Kenneth A.	Minneapolis
Haggard, George D.	Minneapolis	Leavitt, H. H.	Minneapolis	Pineo, W. B.	Minneapolis
Hall, J. M.	Minneapolis	Lebowski, Jos. A.	Minneapolis	Platou, E. S.	Minneapolis
Hall, S. S.	Minneapolis	Lee, H. M.	Minneapolis	Pollard, D. W.	Crosby
Hamel, Arnold L.	Minneapolis	Leland, Harold R.	Minneapolis	Polzak, Jacob A.	Minneapolis
Hamilton, A. S.	Minneapolis	Leland, M. N.	Minneapolis	Poppe, Fred H.	Minneapolis
Hamlin, George B.	Minneapolis	Lenstrom, Jarl	Minneapolis	Pratt, Fred J.	Minneapolis
Hammond, A. J.	Minneapolis	Leonard, J. J.	Minneapolis	Pratt, I. A.	Minneapolis
Hannah, Hewitt B.	Minneapolis	Lind, C. J.	Minneapolis	Preine, I. A.	Minneapolis
Hansen, Elmer H.	Minneapolis	Lindquist, R. H.	Minneapolis	Prim, J. A.	Minneapolis
Hansen, Erling	Minneapolis	Linner, H. P.	Minneapolis	Proshek, Charles E.	Minneapolis
Hansen, Olga S.	Minneapolis	List, Walter E.	Minneapolis	Quinby, Thomas F.	Minneapolis
Hanson, H. J.	Minneapolis	Litchfield, John T.	Minneapolis	Quist, H. W.	Minneapolis
Hanson, H. V.	Minneapolis	Litzenberg, J. C.	Minneapolis	Reed, Chas. A.	Minneapolis
Hare, E. R.	Minneapolis	Logefelt, Rudolph C.	Minneapolis	Rees, S. P.	Minneapolis
Harrington, C. D.	Minneapolis	Long, Jesse	Minneapolis	Regnier, E. A.	Minneapolis
Harrington, F. E.	Minneapolis	Loomis, E. A.	Minneapolis	Reynolds, J. S.	Minneapolis
Hartzell, Thos. B.	Minneapolis	Lundgren, A. C.	Minneapolis	Rice, Carl O.	Minneapolis
Hastings, D. R.	Minneapolis	Lundquist, E. F.	Minneapolis	Richdorf, L. F.	Minneapolis
Hathaway, J. C.	Minneapolis	Lynch, M. J.	Minneapolis	Ridgway, Florence	Minneapolis
Haverfield, Addie R.	Minneapolis	Lyng, John A.	Minneapolis	Rigler, Leo G.	Minneapolis
Hayes, J. M.	Minneapolis	Lyon, E. P.	Minneapolis	Rishmiller, J. H.	Minneapolis
Head, G. D.	Minneapolis	Lyon, J. D.	Minneapolis	Rizer, R. I.	Minneapolis
Hearn, Wm. O.	Minneapolis	Lysne, Henry	Minneapolis	Roan, Carl M.	Minneapolis
Hedback, A. E.	Minneapolis	McCarthy, Donald	Minneapolis	Robb, Edwin F.	Minneapolis
Heim, Russell R.	Minneapolis	McCartney, James S.	Minneapolis	Roberts, Thos. S.	Minneapolis
Helk, H. H.	Minneapolis	McDaniel, Orianna	Minneapolis	Roberts, W. B.	Minneapolis
Hendrickson, J. F.	Minneapolis	McFachran, A.	Minneapolis	Robitshek, E. C.	Minneapolis
Henry, C. E.	Minneapolis	McFarland, A. H.	Minneapolis	Rochford, W. E.	Minneapolis
Henry, Myron O.	Minneapolis	McGandy, R. F.	Minneapolis	Rodda, F. C.	Minneapolis
Herbst, Wm. P.	Minneapolis	McGeary, Geo. E.	Minneapolis	Rodgers, C. L.	Minneapolis
Herman, Arthur L.	Minneapolis	McIntyre, George	Minneapolis	Rosen, S.	Minneapolis
Hiebert, T. P.	Minneapolis	McKinley, C. A.	Minneapolis	Rosenberg, Maurice N.	Minneapolis
Higbee, Paul A.	Minneapolis	McKinley, C. S.	Minneapolis	Rosenwald, R. M.	Minneapolis
Hirvins, I. H.	Minneapolis	McKinney, F. J.	Minneapolis	Rowe, Paul H.	Minneapolis
Hilbert, Eunice	Minneapolis	McKinney, F. S.	Minneapolis	Rucker, Wm. H.	Minneapolis
Hill, Eleanor I.	Minneapolis	McPheeters, H. O.	Minneapolis	Rudell, Gustave	Minneapolis
Hirschfelder, A. D.	Minneapolis	MacDonald, A. E.	Minneapolis	Sadler, William P.	Minneapolis
Hirschfeld, F. R.	Minneapolis	MacDonald, D. A.	Minneapolis	Sawatzky, Wm. A.	Minneapolis
Hoxlund, A. W.	Minneapolis	MacDonald, Irving C.	Minneapolis	Schaaf, F. H. K.	Minneapolis
Hobbs, C.	Minneapolis	Mach, Frank B.	Minneapolis	Scheldrup, N. H.	Minneapolis
Hodoe, S. V.	Minneapolis	Macnie, J. S.	Minneapolis	Schlutz, Frederic W.	Minneapolis
Holland, A. S.	Minneapolis	Maland, C. O.	Minneapolis	Schmitt, A. F.	Minneapolis
Holen, T.	Minneapolis	Mann, A. T.	Minneapolis	Schmitt, S. C.	Minneapolis
Holl, P. M.	Minneapolis	Marclay, W. J.	Minneapolis	Schneider, J. P.	Minneapolis
Holm, Geo. A.	Minneapolis	Mariette, Ernest	Oak Terrace	Schuessler, Otto F.	Minneapolis
Holt, W. B.	Minneapolis	Mark, D. B.	Minneapolis	Schwartz, Virgil J.	Minneapolis
Huenekens, F. J.	Minneapolis	Martinson, C. J.	Wayzata	Schwyzzer, Gustav	Minneapolis
Hughes, Louis D.	Minneapolis	Matchan, Glen R.	Minneapolis	Schwzyer, R.	Minneapolis
Hutchinson, Chas. J.	Minneapolis	Mathews, Justus	Minneapolis	Scott, F. H.	Minneapolis
Hynes, James	Minneapolis	Maxeiner, Stanley R.	Minneapolis	Seashore, Gilbert	Minneapolis
Hynes, John E.	Minneapolis	May, W. H.	Minneapolis	Seham, Max	Minneapolis
Ikeda, Kano	Minneapolis	Mead, Marion A.	Minneapolis	Selleseth, Iver	Minneapolis
		Merkert, Charles E.	Minneapolis	Sessions, John	Minneapolis
		Merkert, G. L.	Minneapolis	Shapiro, Morse J.	Minneapolis
		Meyer, E. L.	Minneapolis		

*Member deceased.

†Application for Emeritus or Honorary membership not completed.

Simons, Jalmar	Minneapolis
Simpson, E. D.	Minneapolis
Simpson, J. D.	Minneapolis
Siperstein, D. M.	Minneapolis
Siverstein, Andrew	Minneapolis
Siverstein, Ivar	Minneapolis
Slocumb, Maude S.	Minneapolis
Smith, A. M.	Minneapolis
Smith, Arthur E.	Minneapolis
Smith, Homer R.	Minneapolis
Smith, Norman M.	Minneapolis
Soderlind, A.	Minneapolis
Solhaug, S. B.	Minneapolis
Somerfield, H. A.	Minneapolis
Spratt, C. N.	Minneapolis
Stewart, C. A.	Minneapolis
Stomel, Joseph	Minneapolis
Strachauer, A. C.	Minneapolis
Strout, E. S.	Minneapolis
Strout, G. Elmer	Minneapolis
Sturte, J. R.	Minneapolis
Sundt, M.	Minneapolis
Swanson, Roy E.	Minneapolis
Sweetser, H. B., Sr.	Minneapolis
Sweetser, H. B., Jr.	Minneapolis
Sweetser, Theodore	Minneapolis

Sweitzer, S. E.	Minneapolis
Taft, John O.	Minneapolis
Tanner, A. C.	Minneapolis
Taylor, Rood	Minneapolis
Tennyson, Theo.	Minneapolis
Ternstrom, O. H.	Minneapolis
Thomas, Geo. E.	Minneapolis
Thomas, Geo. H.	Minneapolis
Thomas, Gilbert J.	Minneapolis
Tingdale, A. C.	Minneapolis
Tunstead, Hugh J.	Minneapolis
Turncliff, D. D.	Minneapolis
Tyrrell, C. C.	Minneapolis
Ude, Walter H.	Minneapolis
Ulrich, Henry L.	Minneapolis
Undine, Clyde A.	Minneapolis
Voyer, Emile O.	Minneapolis
Wahlquist, Harold F.	Minneapolis
Waldron, Carl W.	Minneapolis
Wanous, E. Z.	Minneapolis
Ward, A. W.	Minneapolis
Ward, Percy A.	Minneapolis
Warham, T. T.	Minneapolis
Watson, J. A.	Minneapolis
Webb, R. C.	Minneapolis
Weisman, S. A.	Minneapolis

Welles, H. J.	Minneapolis
Wethall, A. G.	Minneapolis
Wetherby, Macider	Minneapolis
Weum, T. Wm.	Minneapolis
Whetstone, Mary S.	Minneapolis
White, S. Marx	Minneapolis
Widen, W. F.	Minneapolis
Wiese, H. F. B.	Minneapolis
Wilcox, Archa E.	Minneapolis
Wilder, Robert L.	Minneapolis
Willcutt, Clarence	Minneapolis
Williams, H. L.	Minneapolis
Williams, Robert	Minneapolis
Witham, C. A.	Minneapolis
Wittich, F. W.	Minneapolis
Wohlrahe, A. A.	Minneapolis
Wood, Douglas F.	Minneapolis
Woodworth, Elizabeth	Minneapolis
Wright, C. B.	Minneapolis
Wright, Charles D.	Minneapolis
Wright, Franklin R.	Minneapolis
Wynne, H. M. N.	Minneapolis
Yoerg, O. W.	Minneapolis
Zaworski, E. A.	Minneapolis
Zierold, A. A.	Minneapolis

HOUSTON-FILLMORE COUNTY MEDICAL SOCIETY

Regular meetings, not stated.

Annual meeting, October.

Williams, R. V.	Rushford
Helland, J. W.	Spring Grove
Anderson, Norman E.	Harmony
Baldwin, A. E.	Houston
Belote, G. B.	Caledonia

Browning, W. E.	Caledonia
Christianson, H. W.	Wykoff
Davis, I. Grant	Rushford
Drake, F. A.	Lanesboro
Eby, C. B.	Spring Valley
Grinnell, W. B.	Preston
Helland, G. M.	Spring Grove
Helland, J. W.	Spring Grove
Lannin, J. C.	Mabel

Nass, H. A.	Mabel
Onsgard, C. K.	Halstad
Onsgard, L. K.	Houston
Palmer, R. N.	Lanesboro
Tierney, C. M.	Granger
Williams, R. V.	Rushford
Wilson, R. H.	Harmony
Woodruff, C. W.	Chatfield

KANDIYOHI-SWIFT COUNTY MEDICAL SOCIETY

Regular meetings, at call of President.

Annual meeting, at call of President.

Branton, A. F.	Willmar
Scofield, C. L.	Benson
Anderson, R. E.	Atwater
Behmler, Fred W.	Appleton

Branton, A. F.	Willmar
Branton, B. J.	Willmar
Daigault, Oscar	Benson
Davison, P. C.	Willmar
Dowdell, W. J.	Kerkhoven
Frederickson, Alice C.	Lake Lillian
Frederickson, Guy V. Y.	Lake Lillian
French, H. S.	New London
Fiksdal, M. J.	Willmar

Frost, E. H.	Willmar
Hodapp, R. J.	Willmar
Jacobs, Jno. C.	Willmar
Johnson, Hans	Kerkhoven
Kaufman, Wm. C.	Appleton
Rains, J. M.	Willmar
Scofield, C. L.	Benson
Thompson, Arthur	Raymond

LYON-LINCOLN COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesdays.

Annual meeting, October 11, 1927.

Gray, F. D.	Marshall
Workman, H. M.	Tracy
Akester, Ward	Marshall
Bossingham, O. N.	Lake Benton
Chorest, J. C. R.	Marshall

Eng, Sigfred	Cottonwood
Ford, Burton C.	Marshall
Germo, Chas.	Balaton
Gray, F. D.	Marshall
Hermanson, Peter E.	Ivanhoe
Hoidale, A. D.	Tracy
Jacquot, G. L.	Marshall
Nelson, L. E.	Hendricks

Persons, C. E.	Marshall
Robertson, J. B.	Cottonwood
Sanderson, E. T.	Minneota
Thordarson, Theo.	Minneota
Vadheim, A. L.	Tyler
Valentine, W. H.	Tracy
Workman, H. M.	Tracy
Workman, W. G.	Tracy

MCLEOD COUNTY MEDICAL SOCIETY

Regular meetings, no regular dates.

Annual meeting, no definite time set.

Trutna, Thos. J.	Silver Lake
Jensen, A. H.	Hutchinson
Axlrod, D. L.	Hutchinson
Clement, J. B.	Lester Prairie

Crow, E. R.	Minneapolis
Holm, H. H.	Glencoe
Hutterer, Edw. G.	Winsted
Jensen, A. H.	Hutchinson
Klima, W. W.	Stewart
Kohler, F. G.	Minneapolis
Langhoff, A. H.	Glencoe

Sahr, W. G.	Hutchinson
Schmidt, W. R.	Glencoe
Schopp, O. W.	Hutchinson
Sheppard, Fred	Hutchinson
Sheppard, P. E.	Hutchinson
Trutna, Thos. J.	Silver Lake
Weissgerber, L. A.	Brownston

MEEKER COUNTY MEDICAL SOCIETY

Regular meetings, May, August and October.

Annual meeting, December.

Brigham, Frank	Watkins
Danielson, K. A.	Litchfield

Brigham, Frank	Watkins
Danielson, K. A.	Litchfield
Dulude, S. S.	Dassel
O'Connor, D. C.	Eden Valley

Peterson, Alfred	Dassel
Robertson, A. W.	Litchfield
Robertson, W. P.	Litchfield
Wilmot, H. E.	Litchfield

†Application for Emeritus or Honorary membership not completed.

MOWER COUNTY MEDICAL SOCIETY

Regular meetings, last Thursday of each month.
Annual meeting, last Thursday in November.

President	Grise, W. B.	Austin	McKenna, J. K.	Austin
Melzer, G. R.	Hegge, C. A.	Austin	Melzer, G. R.	Lyle
Treasurer	Hegge, O. H.	Austin	Mitchell, R. S.	Grand Meadow
Henslin, A. E.	Henslin, A. E.	LeRoy	Morrow, James J.	Austin
Allen, Chas. C.	Hertel, G. E.	Austin	Morse, M. P.	LeRoy
Cobb, Willis F.	Leck, Clifford C.	Austin	Rebman, E. C.	Austin
Coleman, F. B.	Lewis, Charles F.	Austin	Sheedy, Chester L.	Austin
	Lommen, P. A.	Austin	Torkelson, P. T.	Lyle

NICOLLET-LE SUEUR COUNTY MEDICAL SOCIETY

Regular meetings, September and December.
Annual meeting, December.

President	Daniels, J. W.	St. Peter	Lenander, Melvin E.	St. Peter
Hewson, Wilfred J.	Dodge, F. A.	Le Sueur	LeClerc, J. E.	Le Sueur
Secretary	Eirley, Clara S. Y.	Mt. Pleasant, Ia.	McKeon, J. O.	Montgomery
Daniels, J. W.	Ericson, Swan	Le Sueur	Norris, J. F.	St. Peter
Aitkens, H. B.	Freeman, G. H.	St. Peter	Phelps, R. M.	Faribault
Covell, W. W.	Hewson, Wilfred J.	Stillwater	Smith, B. F.	St. Peter
	Holtan, Theodore	Waterville	Strathern, F. P.	St. Peter

OLMSTED COUNTY MEDICAL SOCIETY

Regular meetings, second Wednesday in April, June, September and December.
Annual meeting, December 21.

President	De Carle, Donald W.	Rochester	Herrmann, S. F.	Rochester
Mussey, R. D.	Decker, Walter J.	Rochester	Heyerdale, O. C.	Rochester
Secretary	Desjardins, Arthur U.	Rochester	Holloway, Jackson K.	Rochester
Piper, M. C.	Ditmore, David C.	Rochester	Horton, Bayard T.	Rochester
Adams, S. Franklin	Dixon, Claude F.	Rochester	Horwitz, Alec.	Rochester
Adson, A. W.	Dixon, Robert K.	Rochester	Huffman, Lester D.	Rochester
Allan, Frank N.	Dolder, F. C.	Eyota	Hunt, V. C.	Rochester
Allen, Edgar V.	Doyle, J. B.	Rochester	Jacobs, Miner F.	Rochester
Allen, Roy W.	Drips, D. G.	Rochester	Johnson, Walter R.	Rochester
Allen, W. A.	Dunlap, H. F.	Rochester	Jones, H. T.	Rochester
Alvarez, Walter C.	Etheredge, Shuler H.	Rochester	Jones, Robert D.	Rochester
Amberg, Samuel	Eubanks, George F.	Rochester	Jordan, Elverse M.	Rochester
Anderson, C. M.	Eusterman, G. B.	Rochester	Jordan, Ferdinand M.	Rochester
Anderson, E. W.	Evarts, Arrah B.	Rochester	Joyce, G. T.	Rochester
Anderson, Mark J.	Faust, Louis S.	Rochester	Judd, E. S.	Rochester
Balfour, D. C.	Fawcett, C. E.	Stewartville	Keith, N. M.	Rochester
Bannick, Edwin G.	Fehland, Harold R.	Rochester	Kennedy, Roger L. J.	Rochester
Barborka, C. J.	Fig, F. A.	Rochester	Kepler, E. J.	Rochester
Bargen, J. Arnold	Finney, W. P., Jr.	Rochester	Kepler, Helen M.	Rochester
Barker, Nelson W.	Fishback, Frederick C.	Rochester	Kernohan, James W.	Rochester
Barnes, A. R.	Flothow, Paul G.	Rochester	Kestel, John L.	Rochester
Baumgartner, Conrad J.	Ford, Frances A.	Rochester	Kilbourne, A. F.	Rochester
Baxter, Geoffrey H.	Fortin, Harry J.	Rochester	Kleinhekel, John L.	Rochester
Bayha, Carl H.	Foster, Wilmot C.	Rochester	Leddy, Eugene T.	Rochester
Beach, Watson	Fox, Ben	Rochester	Lemon, W. S.	Rochester
Benedict, W. L.	Frederickson, Clyde H.	Rochester	Lillie, H. I.	Rochester
Berkman, D. M.	Gaarde, F. W.	Rochester	Lillie, W. I.	Rochester
Binger, Melvin W.	Gay, James G.	Rochester	Linton, W. B.	Rochester
Blackford, Launcelot M.	Giffin, H. Z.	Rochester	Logan, A. H.	Rochester
Bliss, John H.	Gleason, Notery A.	Rochester	Luden, Georgine	Rochester
Bodine, Marc W.	Goeckerman, W. H.	Rochester	Lundy, John S.	Rochester
Bonta, M. B.	Good, Louis P.	Rochester	McCann, James C.	Rochester
Boothby, W. M.	Good, Ralph W.	Rochester	McCuskey, Charles F.	Rochester
Bowing, H. H.	Gorder, Arne C.	Rochester	McKaig, Carl B.	Pine Island
Bowles, John H.	Graham, A. Stephens	Rochester	McKeithen, A. M.	Rochester
Braasch, Wm. F.	Green, George F.	Rochester	McNaugher, William McM.	Rochester
Bratrude, E. J.	Greene, Carl H.	Rochester	McQuiggan, Mark R.	Rochester
Brockbank, Thos. Wm.	Greene, Earle I.	Rochester	McVicar, Chas. S.	Rochester
Broders, A. C.	Greenlee, Daniel P.	Rochester	Magath, T. B.	Rochester
Brown, A. E.	Grier, James P.	Rochester	Malmgren, George E.	Rochester
Brown, Felix M.	Habein, Harold C.	Rochester	Marshall, James M.	Rochester
Brown, G. E.	Hager, Benjamin H.	Rochester	Masson, D. M.	Rochester
Brown, P. W.	Haines, S. F.	Rochester	Masson, J. C.	Rochester
Brumsting, Louis A.	Haldeman, Keene O.	Rochester	Mattson, Hamline	Rochester
Buie, L. A.	Hallenbeck, D. F.	Rochester	May, James A.	Rochester
Bumpus, H. C.	Hamrick, Robert A.	Rochester	Mayo, C. H.	Rochester
Bunten, William A.	Hand, John R.	Rochester	Mayo, Charles W.	Rochester
Busby, James L.	Hane, Richard L.	Rochester	Mayo, W. J.	Rochester
Caylor, Harold D.	Hanlon, Frank R.	Rochester	Maytum, Charles K.	Rochester
Chumley, Charles L.	Harrington, Ethel R.	Rochester	Metheny, David	Rochester
Comfort, Mandred W.	Harrington, S. W.	Rochester	Meyerding, H. W.	Rochester
Conner, H. M.	Hartman, H. R.	Rochester	Miller, Charles D.	Rochester
Corbeille, Catherine	Hartwell, Shattuck W.	Rochester	Mills, Ralph G.	Rochester
Craig, Wm. McK	Hartzell, John B.	Rochester	Moench, L. Mary	Rochester
Crane, Jacob F.	Hausen, Emil D.	Rochester	Moersch, F. P.	Rochester
Crenshaw, J. L.	Havens, Fred Z.	Rochester	Moersch, H. J.	Rochester
Crewe, J. E.	Heck, Frank J.	Rochester	Montgomery, Hamilton	Rochester
Daniels, Harry A.	Heimdal, Clarence O.	Rochester	Moore, A. B.	Rochester
Davis, Austin C.	Helmholz, H. F.	Rochester	Moore, Thomas B.	Rochester
Davis, John D.	Hempstead, B. E.	Rochester	Mussey, R. D.	Rochester
Dean, Benjamin F.	Hench, Philip S.	Rochester	Nagel, G. W.	Rochester
	Henderson, Earl F.	Rochester	Nelson, Marque O.	Rochester
	Henderson, M. S.	Rochester	New, G. B.	Rochester

†Application for Emeritus or Honorary membership not completed.

Nickel, Allen A. C. Rochester
 Nomland, Ruben Rochester
 Norton, Manville W. Rochester
 Nunn, Leslie L. Eveleth
 Nutting, Roland E. Rochester
 O'Leary, P. A. Rochester
 Ochsen, Harold C. Rochester
 Offutt, Susan R. Rochester
 Ohlinger, L. B. Rochester
 Olson, Ernest A. Pine Island
 Palmer, B. M. Rochester
 Parker, H. L. Rochester
 Parson, Geo. W. Rochester
 Parsons, Eloise Rochester
 Passalacqua, Luis A. Rochester
 Pemberton, J. de J. Rochester
 Perry, Clarence L. Rochester
 Peterson, Joel A. Rochester
 Piper, M. C. Rochester
 Plankers, A. G. Dubuque, Iowa
 Plummer, H. S. Rochester
 Plummer, W. A. Rochester
 Pollock, L. W. Rochester
 Pope, Charles E. Rochester
 Prangen, A. D. Rochester
 Prickman, Louis E. Rochester
 Prout, Curtis T. Rochester
 Pugliese, Frank M. Rochester
 Quale, Victor S. Rochester
 Radtke, H. P. Rochester
 Randall, Lawrence M. Rochester

Rankin, F. W. Rochester
 Rentschler, Calvin B. Rochester
 Rentschler, Edwin B. Rochester
 Rieniets, John H. Rochester
 Rivers, A. B. Rochester
 Robertson, H. E. Rochester
 Rohrer, Christian J. Cleveland, Ohio
 Rosenow, E. C. Rochester
 Rowntree, L. G. Rochester
 Rucker, Charles W. Rochester
 Sager, William W. Rochester
 Sanford, A. H. Rochester
 Schmitt, Earl O. G. Rochester
 Schulz, Irwin Rochester
 Shafter, Royce R. Rochester
 Sheldon, W. D. Rochester
 Shippey, Stuart H. Rochester
 Shugrue, John Joseph Rochester
 Simon, Harold E. Rochester
 Sistrunk, W. E. Rochester
 Smith, F. L. Rochester
 Smith, Harry L. Rochester
 Smith, Leonard M. Rochester
 Smith, Newton D. Rochester
 Smith, William M. Rochester
 Snell, Albert M. Rochester
 Squire, Fay H. Rochester
 Stacy, L. J. Rochester
 Stark, W. B. Rochester
 Stephens, Brooks P. Rochester
 Steven, Geo. Byron

Stuhler, Louis G. Rochester
 Sutherland, C. G. Rochester
 Synhorst, Alfred P. Rochester
 Thomas, Lester C. Rochester
 Thompson, Gershom J. Rochester
 Thompson, H. L. Rochester
 Tinkness, Donald E. Rochester
 Vickery, Eugene B. Rochester
 Viecelli, James D. Rochester
 Vinson, P. P. Rochester
 von Lackum, W. H. Rochester
 Vories, Ruth E. Rochester
 Wagener, H. P. Rochester
 Walters, H. W. Rochester
 Weber, H. M. Rochester
 Weir, J. F. Rochester
 Weillbrock, William L. Rochester
 Wheeler, Theodora Rochester
 White, Robert B. Rochester
 Whitten, Merritt B. Rochester
 Wickham, Mont. C. Rochester
 Wilder, R. M. Rochester
 Wilhelm, Charles M. Rochester
 Williams, Henry L., Jr. Rochester
 Williams, Thomas B. Rochester
 Willius, F. A. Rochester
 Wilson, L. B. Rochester
 Wolman, H. W. Rochester
 Wood, H. G. Rochester
 Yater, Wallace M. Rochester
 Ziegler, Lloyd H. Rochester

PARK REGION DISTRICT AND COUNTY MEDICAL SOCIETY

Douglas, Grant, Otter Tail, and Wilkin Counties.

Regular meetings, second Wednesday in January, April, July and October.

Annual meeting, second Wednesday in October.

Lee, W. A. President Fergus Falls
 Secretary
 Satersmoen, Theo. Pelican Rapids
 Baker, A. C. Fergus Falls
 Blakey, A. R. Osakis
 Boysen, Peter Pelican Rapids
 Brabec, F. F. Perham
 Brabec, F. J. Perham
 Broker, W. S. Battle Lake
 Burnap, W. L. Fergus Falls
 Cowing, P. G. Evansville

Drought, W. W. Fergus Falls
 Esser, John Pernau
 Estrem, C. O. Fergus Falls
 Freeborn, J. A. Fergus Falls
 Hand, W. R. Elbow Lake
 Haskell, A. D. Alexandria
 Heiberg, E. A. Fergus Falls
 Kierland, P. E. Alexandria
 Kittelson, T. N. Fergus Falls
 Lee, W. A. Fergus Falls
 Leibold, H. H. Parkers Prairie
 Lewis, A. J. Henning
 Love, Fred A. Carlos

Meckstroth, C. W. Brandon
 Meland, Ernest Dalton
 Nelson, O. N. Battle Lake
 Nelson, Wallace I. Underwood
 Otto, H. C. Frazee
 Parson, L. R. Elbow Lake
 Patterson, W. L. Fergus Falls
 Paulson, T. S. Fergus Falls
 Satersmoen, Theo. Pelican Rapids
 Shering, O. T. Fergus Falls
 Tanquist, E. J. Alexandria
 Vail, James B. Henning
 Wray, W. E. Campbell

RAMSEY COUNTY MEDICAL SOCIETY

Regular meetings, last Monday of month except June, July, and August.

Annual meeting, last Monday of January.

Jones, E. M. President St. Paul
 Secretary
 Schulze, Albert G. St. Paul
 Abbott, J. S. St. Paul
 Ahrens, A. E. St. Paul
 Ahrens, A. H. St. Paul
 Alberts, Max W. St. Paul
 Alden, J. F. St. Paul
 Aldes, Harry St. Paul
 Alexander, F. H. St. Paul
 Allen, Mason St. Paul
 Arends, A. L. St. Paul
 Armstrong, J. M. St. Paul
 Arnquist, A. S. St. Paul
 Aroun, Khalil St. Paul
 Arzt, C. P. St. Paul
 Aurelius, J. Richards St. Paul
 Ausman, Carl F. St. Paul
 Bacon, Donald K. St. Paul
 Bacon, Knox San Diego, Calif.
 Bacon, L. C. St. Paul
 Balcome, F. E. St. Paul
 Ball, C. R. St. Paul
 Barry, L. W. St. Paul
 Barsness, Nellie St. Paul
 Beadie, W. D. Cannon Falls
 Beals, Hugh St. Paul
 Bell, C. C. St. Paul
 Benepe, L. M. St. Paul
 Bennion, P. H. St. Paul
 Bentley, Norman P. St. Paul
 Berrisford, Paul D. St. Paul
 Binger, H. E. St. Paul
 Birnberg, T. L. St. Paul
 Bock, R. A. St. Paul

Boeckmann, Egil St. Paul
 Bohland, E. H. St. Paul
 Bole, R. S. St. Paul
 Bolstad, H. C. St. Paul
 Borg, Joseph F. St. Paul
 Bouma, L. R. St. Paul
 Brand, G. D. St. Paul
 Bray, E. R. St. Paul
 Brimhall, J. B. St. Paul
 Brodie, Walter D. St. Paul
 Brooks, D. F. St. Paul
 Brooks, G. F. St. Paul
 Brown, Ed. I. St. Paul
 Brown, John C. St. Paul
 Brown, S. E. St. Paul
 Burch, F. E. St. Paul
 Burfiend, G. H. St. Paul
 Burns, F. W. St. Paul
 Burns, R. M. St. Paul
 Burton, Carl G. St. Paul
 Busher, H. St. Paul
 Caldwell, Jas. P. St. Paul
 Caldwell, Kenneth S. St. Paul
 Cameron, J. A. St. Paul
 Campbell, J. E. South St. Paul
 Cannon, Harry St. Paul
 Carman, C. L. St. Paul
 Carman, Paul I. St. Paul
 Carroll, Wm. C. St. Paul
 Carter, Fred G. St. Paul
 Cavanaugh, J. O. St. Paul
 Chatterton, C. C. St. Paul
 Christiansen, A. St. Paul
 Christison, J. T. St. Paul
 Clark, T. C. Minneapolis
 Colby, Woodard St. Paul
 Cole, Wallace W. St. Paul
 Collie, H. G. St. Paul

Colvin, A. R. St. Paul
 Constock, A. E. St. Paul
 Connor, Wm. H. Minneapolis
 Connor, C. E. St. Paul
 Cook, Paul B. St. Paul
 Countryman, Roger S. St. Paul
 Cowern, E. W. North St. Paul
 Critchfield, L. R. St. Paul
 Crump, J. W. St. Paul
 Culligan, J. M. St. Paul
 Dack, Lloyd G. St. Paul
 Darling, J. B. St. Paul
 Daugherty, E. B. St. Paul
 Daugherty, L. E. St. Paul
 Davis, Herbert St. Paul
 Davis, William St. Paul
 Dedolph, Karl St. Paul
 Derauf, B. I. St. Paul
 Dickson, Thos. H., Jr. St. Paul
 Dittman, Geo. C. St. Paul
 Dohm, A. St. Paul
 Donohue, P. F. St. Paul
 Drake, Carl B. St. Paul
 Dunn, J. N. St. Paul
 Dunne, Gerald P. St. Paul
 Earl, George A. St. Paul
 Earl, Robert O. St. Paul
 Edlund, G. St. Paul
 Ely, O. S. South St. Paul
 Emerson, E. C. St. Paul
 Endress, E. K. St. Paul
 Engberg, E. J. St. Paul
 Ernest, G. C. St. Paul
 Eshelby, E. C. St. Paul
 Fahey, E. W. St. Paul
 Ferguson, J. C. St. Paul
 Fesler, Harold H. St. Paul
 Flagstad, A. E. St. Paul

Fogarty, Chas. W.	St. Paul	Kvitrud, G.	St. Paul	Rogers, John T.	St. Paul
Foley, F. E. B.	St. Paul	Langenderfer, F. V.	St. Paul	Rosenhultz, Burton	St. Paul
Freeman, C. D.	St. Paul	Larsen, C. L.	St. Paul	Rosenthal, Robert	St. Paul
Fulton, J. F.	St. Paul	Larson, M. L.	St. Paul	Rothrock, J. L.	St. Paul
Gager, E. C.	St. Paul	Lax, Morris H.	St. Paul	Rothschild, H. J.	St. Paul
Garbrecht, Arthur	St. Paul	Lehy, Bartholomew	St. Paul	Roy, Philemon	St. Paul
Gardiner, D. G.	St. Paul	Leavenworth, Richard O.	St. Paul	Ruhberg, George N.	St. Paul
Geer, Everett K.	St. Paul	Leitch, Archibald	St. Paul	Rumpf, William H.	Minneapolis
Gehlen, J. N.	St. Paul	Leonard, Gilbert J.	St. Paul	Rutherford, W. C.	St. Paul
Geissinger, John D.	St. Paul	Lepak, John A.	St. Paul	Ryan, John J.	St. Paul
Geist, George A.	St. Paul	Lerche, William	St. Paul	Ryan, Mark E.	St. Paul
Ghent, C. Harry	St. Paul	Lewis, W. W.	St. Paul	Satterlund, Victor	St. Paul
Ghent, M. M.	St. Paul	Lick, C. Louis	St. Paul	Savage, F. J.	St. Paul
Giffilan, J. S.	St. Paul	Light, S. E.	St. Paul	Schoch, R. B.	St. Paul
Ginsberg, Wm.	St. Paul	Little, W. J.	St. Paul	Schons, E.	St. Paul
Goltz, E. V.	St. Paul	Lowe, Earl R.	South St. Paul	Schuldt, F. C.	St. Paul
Gratzek, Thos.	St. Paul	Lowe, Thomas	South St. Paul	Schulze, Albert G.	St. Paul
Greene, Charles L.	St. Paul	Lund, Arthur E.	St. Paul	Schwytzer, Arnold	St. Paul
Gruenhagen, Arnold P.	St. Paul	Lundholm, A. M.	St. Paul	Senkler, G. E.	St. Paul
Guyer, L. G.	Staten Island, New York	McBeath, Ewing C.	New York City	Setzer, G. W.	Helena, Mont.
Haganan, Geo. K.	St. Paul	McCarthy, W. R.	St. Paul	Setzer, H. J.	St. Paul
Hall, A. R.	St. Paul	McClanahan, J. H.	White Bear	Shannon, W. Roy	St. Paul
Hall, Henry H.	St. Paul	McClanahan, J. S.	White Bear	Shellman, John L.	St. Paul
Halper, Philip	St. Paul	McCloud, C. N.	St. Paul	Shillington, M. A.	St. Paul
Hammes, E. M.	St. Paul	McKeon, Owen	St. Paul	Simon, B. F.	St. Paul
Hammond, J. F.	St. Paul	McLaren, Jeanette M.	St. Paul	Skinner, H. O.	St. Paul
Harmon, G. E.	St. Paul	McNevin, C. F.	St. Paul	Snyder, G. W.	St. Paul
Hartfiel, Wm. F.	St. Paul	Martineau, J. L.	St. Paul	Sohlberg, Olof	St. Paul
Hartley, E. C.	St. Paul	Meyerding, E. A.	St. Paul	Souster, B. B.	St. Paul
Hauser, V. P.	St. Paul	Miles, L. M.	St. Paul	Sprafka, J. M.	St. Paul
Hawkins, V. J.	St. Paul	Mitchell, Frederick	St. Paul	Sterner, E. G.	St. Paul
Heath, A. C.	St. Paul	Mogilner, S. N.	St. Paul	Sterner, O. W.	St. Paul
Heck, Wm. W.	St. Paul	Molander, H. A.	St. Paul	Stevens, F. A.	Lake Elmo
Hedenstrom, F. G.	St. Paul	Moquin, Marie A.	St. Paul	Stewart, Alexander	St. Paul
Hengstler, W. H.	St. Paul	Morrissey, F. B.	St. Paul	Stierle, Adolph, Jr.	St. Paul
Hensel, C. N.	St. Paul	Mortenson, N. G.	St. Paul	Stinnette, S. E.	St. Paul
Herrmann, Edgar T.	St. Paul	Moskovitz, Selic	St. Paul	Stolpestad, H. L.	St. Paul
Hesselgrave, S. S.	St. Paul	Moss, Myer N.	St. Paul	Swanson, Edwin O.	St. Paul
Hilger, A. W.	St. Paul	Movnihan, T. J.	St. Paul	Swanson, John A.	St. Paul
Hilger, D. D.	St. Paul	Muller, K. Theo.	St. Paul	Sweeney, Arthur	St. Paul
Hilger, L. A.	St. Paul	Myers, Thos.	St. Paul	Swendson, J. J.	St. Paul
Hiniker, Louis P.	St. Paul	Neher, F. H.	St. Paul	Taylor, H. L.	St. Paul
Hochfilzer, J. J.	St. Paul	Nelson, L. A.	St. Paul	Teisberg, C. B.	St. Paul
Hoff, Alfred	St. Paul	Nesbit, Harold T.	St. Paul	Tiber, L. J.	St. Paul
Hoffman, Max H.	St. Paul	Nippert, H. T.	St. Paul	Tregilgas, H. R.	South St. Paul
Holcomb, J. T.	St. Paul	Nordin, C. G.	St. Paul	Van Slyke, Chas. A.	St. Paul
Holcomb, O. W.	St. Paul	Norris, Edgar H.	St. Paul	Von der Weyer, Wm.	St. Paul
Howard, W. S.	St. Paul	Nye, Katherine A.	St. Paul	Waas, Charles W.	St. Paul
Hultkrans, Joel C.	St. Paul	Nye, Lillian L.	St. Paul	Walker, R. E.	St. Paul
Hunt, H. E.	St. Paul	O'Brien, H. J.	St. Paul	Wallinga, John H.	St. Paul
Ide, A. W.	St. Paul	O'Connor, I. A.	St. Paul	Warnock, R. W.	St. Paul
Johnson, Asa M.	St. Paul	O'Connor, J. P.	St. Paul	Warren, E. L.	St. Paul
Johnson, Hartland C.	St. Paul	Oerting, Harry	St. Paul	Warwick, Margaret	St. Paul
Johnson, Ray G.	St. Paul	Ogden, Warner	St. Paul	Webber, Fred L.	St. Paul
Johnson, T. H.	St. Paul	Ohage, Justus	St. Paul	Welch, M. C.	St. Paul
Jones, D. C.	St. Paul	Ohage, Justus, Jr.	St. Paul	Werner, O. S.	St. Paul
Jones, E. M.	St. Paul	Olson, Chas. A.	St. Paul	Wheeler, M. W.	St. Paul
Kadecky, David	St. Paul	Ostergren, E. W.	St. Paul	Whitacre, J. C.	St. Paul
Kamman, Gordon R.	St. Paul	Pearson, F. R.	St. Paul	Whitcomb, Ed. H.	St. Paul
Kannary, E. L.	St. Paul	Pedersen, A. H.	St. Paul	White, J. S.	St. Paul
Kelly, John V.	St. Paul	Penny, L. E.	St. Paul	Whitmore, F. W.	St. Paul
Kelly, Paul H.	St. Paul	Perry, C. G.	St. Paul	Whitney, A. W.	St. Paul
Kennedy, W. A.	St. Paul	Peterson, V. N.	St. Paul	Williams, Clayton	St. Paul
Kenny, H. F.	St. Paul	Plondke, F. J.	St. Paul	Williamson, George A.	St. Paul
Kesting, Herman	St. Paul	Prendergast, H. J.	St. Paul	Wold, K. C.	St. Paul
King, George L.	St. Paul	Ramsey, W. R.	St. Paul	Winnick, J. B.	St. Paul
King, Z. P.	St. Paul	Richards, E. T. F.	St. Paul	Wolfe, H. H.	St. Paul
Kistler, A. S.	St. Paul	Richardson, Harold E.	St. Paul	Ylvisaker, L. S.	St. Paul
Klein, H. N.	St. Paul	Riggs, C. E.	St. Paul	Zander, C. H.	St. Paul
Knauff, M. K.	St. Paul	Ritchie, H. P.	St. Paul	Zimmermann, H. B.	St. Paul

RED RIVER VALLEY MEDICAL SOCIETY

Kittson, Mahnommes, Marshall, Norman, Pennington, Polk,
Red Lake and Roseau Counties.

Regular meetings, April, September and December.

Annual meeting, second Tuesday in December.

Norman, J. F.	President	Crookston	Delmore, J. L.	Roseau	Morley, G. A.	Crookston
Oppegaard, M. O.	Secretary	Crookston	Dunlop, Alex.	Crookston	Nelson, H. E.	Crookston
Adkins, C. M.	Grygla	Edstrom, Henry	Edstrom, Henry	Crookston	Nerad, Anton H.	Argyle
Anderson, J. K.	Crookston	Engstrand, Oscar J.	Engstrand, Oscar J.	Warren	Norman, J. F.	Crookston
Anderson, W. S.	Minneapolis	Erickson, J. L.	Erickson, J. L.	Twin Valley	Ohnstad, J. L.	McIntosh
Bernard, B. C.	Thief River Falls	Fried, Louis A.	Fried, Louis A.	Foston	Oppegaard, C. L.	Crookston
Bertelson, O. L.	Crookston	Froehlich, H. W.	Froehlich, H. W.	Thief River Falls	Oppegaard, M. O.	Crookston
Biedermann, Jacob	Thief River Falls	Griffin, P. J.	Griffin, P. J.	Fertile	Overend, K. V.	Hallock
Blegen, H. M.	Warren	Hansen, M.	Hansen, M.	Ada	Roy, J. A.	Red Lake Falls
Borreson, Baldwin	Remer	Henney, Wm. H.	Henney, Wm. H.	McIntosh	Sather, Allen	Foston
Bowers, J. T.	Thief River Falls	Hodgson, H. H.	Hodgson, H. H.	Crookston	Shaleen, A. W.	Hallock
Bratrud, O. Edward	Warren	Hollands, W. H.	Hollands, W. H.	Fisher	Shedlov, A.	Foston
Bratrud, Theodor	Warren	Holmes, W. B.	Holmes, W. B.	Ada	Shelland, J. T.	Ada
Brousseau, J. E.	Argyle	Holte, H.	Holte, H.	Crookston	Stratte, J. J.	Hallock
Brown, Lyle L.	Crookston	Kahala, Arthur	Kahala, Arthur	Crookston	Swendberg, A. W.	Thief River Falls
Dahlquist, G. W.	Lancaster	Kirk, G. P.	Kirk, G. P.	East Grand Forks	Turnbull, Robert	Foston
Dean, Arthur C.	Crookston	Larson, A. L.	Larson, A. L.	Fertile	Vistaunet, P. S.	Shelly
		Leitch, N. M.	Leitch, N. M.	Warroad	Watson, N. M.	Red Lake Falls
		Locken, O. E.	Locken, O. E.	Crookston	Wattam, G. S.	Warren
		Melby, O. F.	Melby, O. F.	Thief River Falls	Wiltout, I. Geo.	Oslo
		Mercil, Wm. F.	Mercil, Wm. F.	Crookston		

†Application for Emeritus or Honorary membership not completed.

REDWOOD-BROWN COUNTY MEDICAL SOCIETY

Regular meetings, upon call of President.

Annual meeting, June.

Acting President	
Weiser, Geo. B.	New Ulm
Secretary	
Meierding, Wm. A.	New Ulm
Adams, J. L.	Morgan
Dubbe, F. H.	New Ulm
Eckstein, A. W.	Comfrey
Fritsche, Albert	New Ulm
Fritsche, L. A.	New Ulm

Goblirah, A. P.	Sleepy Eye
Hammermeister, Theodore F.	New Ulm
Jamieson, Earl	Walnut Grove
Kiefer, M. A.	Sleepy Eye
Kolset, Carl D.	Sanborn
Madden, John F.	Gibbon
Meierding, Wm. A.	New Ulm
Pederson, O. J.	Hanska
Peterson, R. A.	Vesta
Reineke, George F.	New Ulm
Rothenburg, J. C.	Springfield

Saffert, Cornelius A.	New Ulm
Schoch, J. L.	New Ulm
Seifert, Otto J.	New Ulm
Shrader, J. S.	Springfield
Strickler, Mary	Sleepy Eye
Vogel, Joseph	New Ulm
Vogel, Melvin A.	Minneapolis
Weiser, Geo. B.	New Ulm
Wellcome, J. W. B.	Sleepy Eye
Wohlrahe, Clarence F.	Springfield
Wohlrahe, E. J.	Springfield

RICE COUNTY MEDICAL SOCIETY

Annual meeting, December.

President	
Smith, P. A.	Faribault
Secretary	
Plonske, C. J.	Faribault
Babcock, F. M.	Northfield
Backe, Edmond	Kenyon
Beede, Ethel R.	Faribault
Davis, F. U.	Faribault
Dungay, Neil S.	Northfield
Francis, David W.	Morristown

Haessly, S. B.	Faribault
Hanson, A. M.	Faribault
Haskins, John L.	Northfield
Haynes, A. L.	Faribault
Huxley, F. R.	Faribault
Kanne, C. W.	Faribault
Lee, W. P.	Northfield
Lexa, F. J.	Lonsdale
McBroom, D. E.	Faribault
Mayland, M. L.	Faribault
Meyer, P. F.	Faribault
Moses, Joseph, Jr.	Northfield

Murdoch, J. M.	Faribault
Neseth, O. S.	Kenyon
Plonske, C. J.	Faribault
Robilliard, C. M.	Faribault
Robilliard, W. H.	Faribault
Rumpf, C. W.	Faribault
Rumpf, W. H.	Faribault
Smith, P. A.	Faribault
Traeger, C. A.	Faribault
Warren, F. S.	Faribault
Wilson, Warren	Northfield
Wilson, W. E.	Northfield

SAINT LOUIS COUNTY MEDICAL SOCIETY

St. Louis, Lake, Cook and Carlton Counties.

Regular meetings, second Thursday each month.

Annual meeting, second Thursday in October.

President	
Kuth, J. R.	Duluth
Secretary	
Elias, F. J.	Duluth
Abbott, Wm. P.	Duluth
Adams, B. S.	Hibbing
Alexander, Clifford E.	Duluth
Anderson, Hilding C.	Duluth
Arminen, K. V.	Duluth
Armstrong, E. L.	Duluth
Athens, A. G.	Duluth
Ayres, G. T.	Ely
Bagley, W. R.	Duluth
Bakkila, Henry	Duluth
Bardon, Richard	Duluth
Barney, L. A.	Duluth
Berdez, G. L.	Duluth
Bergquist, K. E.	Duluth
Bianco, A. J.	Duluth
Binet, H. E.	Grand Rapids
Blacklock, S. S.	Hibbing
Blakely, C. C.	Barnum
Block, Phoebe P.	Virginia
Roman, P. G.	Duluth
Bowen, Robert L.	Hibbing
Boyer, S. H.	Duluth
Braden, A. J.	Duluth
Bradley, E. L.	Superior, Wis.
Braverman, N. J.	Duluth
Bray, C. W.	Biwabik
Briggs, F. W.	Duluth
Brunet, L. M.	Cloquet
Bullen, F. W.	Hibbing
Burns, R. L.	Two Harbors
Carstens, C. F.	Hibbing
Chapman, T. L.	Duluth
Cheney, E. L.	Duluth
Christensen, E. P.	Two Harbors
Clark, F. F.	Duluth
Clement, T. G.	Duluth
Collins, A. N.	Duluth
Collins, H. C.	Duluth
Cosgrove, J. H.	Duluth
Coventry, W. A.	Duluth
Davis, B. F.	Duluth
Davis, H. S.	Duluth
Doolittle, L. E.	Duluth
Doyle, George C.	Duluth
Drenning, F. C.	Duluth
Eckman, P. F.	Duluth
Eisenman, W. G.	Chisholm
Eklblad, J. W.	Duluth

Eklund, Wm. J.	Duluth
Elias, F. J.	Duluth
Empie, W. M.	Virginia
Ferreira, Gideon J.	Duluth
Fischer, Mario McC.	Duluth
Fleming, James	Cloquet
Forbes, R. S.	Duluth
Gardner, R. D.	Eveleth
Gauthier, W. L.	Virginia
Gillespie, M. G.	Duluth
Gillespie, N. H.	Duluth
Gowan, L. R.	Duluth
Graham, David	Duluth
Graham, R. D.	Duluth
Graham, Robert	Duluth
Grawn, F. A.	Duluth
Gray, Royal C.	Minneapolis
Greeley, L. Q.	Duluth
Groulx, H. J.	Virginia
Hall, Andrea E.	Virginia
Haney, C. L.	Duluth
Harris, C. N.	Chisholm
Hatch, W. E.	Duluth
Hayes, M. F.	Nashauk
Heimark, O. E.	Duluth
Hill, Frederic E.	Duluth
Hirschboeck, F. J.	Duluth
Hirschfeld, M. S.	Duluth
Hovde, H.	Duluth
Hursh, M. M.	Grand Rapids
Jensen, T. J.	Duluth
Kean, N. D.	Coleraine
Kerlan, M.	Bemidji
Keyes, C. R.	Duluth
Kiesling, I. H.	Nashauk
King, W. S.	Eveleth
Kleiny, Harry	Duluth
Kliman, Frank E.	Duluth
Knapp, F. N.	Duluth
Kohlbray, C. O.	Duluth
Kraft, Peter	Duluth
Kuth, J. R.	Duluth
Laird, A. T.	Nopeming
Lenont, C. B.	Virginia
Lepak, F. J.	Duluth
Lindgren, E. I.	Duluth
Litman, Samuel N.	Duluth
Loofbourrow, Elias H.	Keewatin
Lum, C. E.	Duluth
McCarty, P. D.	Ely
McComb, C. F.	Duluth
McCoy, Mary	Duluth
McDaniel, S. P.	Mountain Iron
McDonald, A. L.	Duluth

McHaffie, O. L.	Duluth
McIntyre, E. H.	Virginia
McMurtry, Walter C.	Virginia
McNutt, John R.	Two Harbors
MacRae, Gordon C.	Duluth
MacTariane, P. H.	Chisholm
Magie, W. H.	Duluth
Magney, F. H.	Duluth
Manley, J. R.	Duluth
Martin, W. C.	Duluth
Mattill, P. M.	Oak Terrace
Mayne, Roy Malone	Duluth
Merriman, L. L.	Duluth
Moe, Thomas	Moose Lake
Monroe, P. B.	Soudan
Morcom, H. W.	Duluth
More, C. W.	Eveleth
Morsman, L. W.	Hibbing
Morse, C. R.	Zumbrota
Murray, D. D.	Duluth
Nelson, E. H.	Chisholm
Nelson, R. L.	Duluth
Nicholson, M. A.	Duluth
Olson, Albert E.	Duluth
Oredson, O. A.	Duluth
Pake, S. G.	Duluth
Parker, O. W.	Ely
Paulson, G. A.	Duluth
Payette, C. H.	Duluth
Pennie, D. F.	Duluth
Perley, A. E.	Chisholm
Peterson, Edward	Buhl
Power, J. E.	Duluth
Raadquist, C. S.	Hibbing
Raihala, John	Virginia
Raiter, Franklin W. S.	Cloquet
Raiter, Roy F.	Cloquet
Reynolds, Hugh	Hibbing
Robinson, J. M.	Duluth
Rood, D. C.	Duluth
Rowe, O. W.	Duluth
Rudie, P. S.	Duluth
Ryan, W. J.	Duluth
St. Clair, G. G.	Duluth
Scherer, C. A.	Duluth
Schroeder, C. H.	Duluth
Seashore, D. E.	Duluth
Shapiro, E. Z.	Duluth
Shaw, A. W.	Buhl
Slyfield, F. F.	Duluth
Smith, C. M.	Duluth
Smith, E. K.	Duluth
Spicer, F. W.	Duluth

*Member deceased.

ROSTER OF THE MINNESOTA STATE MEDICAL ASSOCIATION

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Strathern, M. L. Gilbert
Strobel, W. G. Duluth
Stuart, A. B. Cloquet
Sukerforth, L. A. Duluth
Sutherland, H. N. Ely
Swenson, Arnold O. Duluth
Swenson, Paul C. Duluth
Taylor, C. W. Duluth

Tibbetts, M. H. Duluth
Tilderquist, D. L. Duluth
Tuohy, E. L. Duluth
Urberg, S. E. Duluth
Vercellini, C. E. Duluth
Walker, A. E. Duluth
Webber, Edward E. Duluth
Weber, M. L. Duluth

Webster, H. E. Duluth
Weirick, Howard R. Hibbing
Wheeler, D. W. Duluth
Wilkinson, Stella Duluth
Winter, J. A. Duluth
Young, T. O. Duluth
Young, V. A. Duluth
Zlatovski, Michael. Duluth

SCOTT-CARVER COUNTY MEDICAL SOCIETY

Regular meetings, first Thursday in March, June, September and December.

Annual meeting, first Thursday in June.

President
Maertz, W. F. New Prague
Secretary
Reiter, H. W. Shakopee
Bohland, F. J. von Belle Plaine
Buck, Fred H. Shakopee
Cervenka, Charles F. New Prague

Eklund, E. J. Norwood
Fischer, H. P. Shakopee
Fischer, P. M. Shakopee
Hebeisen, M. B. Carver
Henriksen, H. G. Elko
Juergens, H. M. Belle Plaine
McKeon, James St. Paul
Maertz, W. F. New Prague
Nagel, H. D. Waconia

Novak, E. E. New Prague
Olson, Chester J. Belle Plaine
Phillips, W. H. Jordan
Reiter, H. W. Shakopee
Schneider, H. A. Jordan
Simons, Bern. H. Chaska
Westerman, A. E. Montgomery
Westerman, F. C. Montgomery

SOUTHWESTERN MINNESOTA MEDICAL SOCIETY

Regular meetings, May and November.

Annual meeting, November.

President
McCrea, Jas. Fulda
Secretary
McKeown, E. G. Pipestone
Arnold, E. W. Adrian
Atkins, G. L. Jackson
Basinger, Harvey R. Mountain Lake
Basinger, H. P. Windom
Benjamin, W. G. Pipestone
Boenkamp, F. W. Luverne
Bong, J. H. Jasper
Brown, A. H. Pipestone
Chadbourn, A. G. Heron Lake
Cress, P. J. Ellsworth
DeBoer, Hermanus Edgerton
Dolan, C. P. Worthington
Doms, H. C. Slayton
Doms, Wm. Woodstock

Dudley, J. H. Windom
Erpelding, J. K. Adrian
Golden, C. M. Tyler
Halloran, Walter Jackson
Hilger, J. M. Iona
Hitchings, W. S. Lakefield
Johnson, Ellsworth Windom
Kelling, Louis F. Lakefield
Kendahl, A. M. Jasper
Kilbride, E. A. Worthington
Leebens, J. H. Lismore
Lowe, Thos. Pipestone
McCrea, James Fulda
McKeown, E. G. Pipestone
Manson, F. M. Worthington
Metcalf, F. W. Fulda
Mork, B. O. Worthington
Mueller, G. G. Windom
Nusbaum, D. H. Jackson

Patterson, W. E. Westbrook
Piper, Wm. A. Mountain Lake
Rose, J. T. Lakefield
Roust, H. A. Rutherford
Schutz, Elmer S. Mountain Lake
Sherman, C. L. Luverne
Slater, S. A. Worthington
Smallwood, J. T. Worthington
Sogge, L. Windom
Stanley, C. R. Worthington
Taylor, Wm. J. Pipestone
Thorson, E. O. Luverne
Tiedemann, Elmer J. Adrian
Tofte, Josephine Dawson
Waller, Joseph D. Wilmont
Warren, C. L. Brewster
Watson, F. G. Worthington
Williams, Leon A. Slayton
Wright, C. O. Luverne

STEARNS-BENTON COUNTY MEDICAL SOCIETY

Annual meeting, April.

President
Sherwood, G. E. Kimball
Secretary
Stangl, P. E. St. Cloud
Boehm, J. C. St. Cloud
Brigham, C. F. St. Cloud
Buscher, Julius Albany
DuBois, J. A. Sauk Center
DuBois, J. F. Sauk Center
Freeman, W. L. St. Cloud
Friesleben, Wm. Sauk Rapids
Gallagher, B. J. St. Cloud
Gelz, J. J. St. Cloud
Groebner, O. A. Cold Spring

Gulde, W. C. St. Cloud
Haberman, E. Osakis
Hemstead, Werner St. Cloud
Jacobson, Clarence Kimball
Johnson, Walfred Sauk Center
Jones, Richard N. Richmond
Kern, M. J. St. Cloud
Kohler, D. W. St. Joseph
Kuhlman, Aug. Melrose
Lewis, C. B. St. Cloud
Libert, John N. St. Cloud
McDowell, J. P. St. Cloud
McKibben, H. E. St. Cloud
Mahwald, A. Albany
Meyer, A. A. Melrose

Moynihan, A. F. Sauk Center
Myre, C. R. Paynesville
Pilon, P. C. Paynesville
Rathbun, A. M. Rice
Rathbun, C. A. St. Cloud
Richards, W. B. St. Cloud
Richardson, Fred S. Belgrade
Ridgway, Alexander Belgrade
Schatz, F. J. St. Cloud
Sherwood, G. E. Kimball
Stangl, Fred St. Cloud
Stangl, P. E. St. Cloud
Sutton, Chas. S. St. Cloud
Townsend, DeWayne Broton
Wenner, W. T. St. Cloud

STEELE COUNTY MEDICAL SOCIETY.

Regular meetings, second Tuesday every odd month.

Annual meeting, November.

President
Ertel, E. Q. Ellendale
Secretary
McIntyre, John A. Owatonna

Ertel, E. Q. Ellendale
Gault, C. C. Owatonna
Hart, Alfred B., Jr. Owatonna
McIntyre, John A. Owatonna
Melby, Benedik Blooming Prairie
Nelson, Ernest J. Owatonna

Peterson, Christian Owatonna
Quigley, T. C. Owatonna
Senn, E. W. Owatonna
Smersh, F. M. Owatonna
Smersh, J. F. Owatonna
Stewart, A. B. Owatonna

†Application for Emeritus or Honorary membership not completed.

UPPER MISSISSIPPI MEDICAL SOCIETY

Annual meeting, February.

President
Ghostley, Mary C. International Falls

Secretary
Badeaux, G. I. Brainerd

Agnew, Allen T. International Falls
Allen, F. A. Crosby
Allen, F. H. Staples
Anderson, C. E. Brainerd
Badeaux, G. I. Brainerd
Beise, R. A. Brainerd
Cantwell, W. F. International Falls
Carlson, H. A. Brainerd
Christie, G. R. Long Prairie
Christie, R. L. Long Prairie
Cook, Jay M. Staples
Corrigan, J. E. Spooner
Craig, C. C. International Falls
Davis, L. Thomas Wadena
Davis, Thayer C. Wadena
Forrest, C. G. Clearbrook
Frost, Harry T. Wadena
Garlock, A. V. Bemidji
Garlock, Dewitt H. Bemidji
Gerber, Milo P. Brainerd

Ghostley, Mary C. International Falls
Gilmore, Rowland Bemidji
Grogan, J. S. Wadena
Groschup, Theo. P. Bemidji
Grose, Fredk. N. Bertha
Halenbeck, Philip L. St. Cloud
Hawkinson, L. F. Brainerd
Healy, R. T. Pierz
Hilton, J. M. Browerville
Holst, C. F. Little Falls
Holst, J. B. Little Falls
House, Z. E. Cass Lake
Houston, C. A. Park Rapids
Jacobson, David J. Blackduck
Johnson, E. W. Bemidji
Johnson, O. V. Sebeka
Kelly, B. W. Aitkin
Kenyon, Paul Wadena
Kerlan, S. Z. Aitkin
Laney, R. L. Puposky
Larson, L. M. St. Paul
Laughlin, J. T. Grey Eagle
McCann, D. F. Bemidji
McHugh, Roderick F. Aitkin
McKinnon, J. J. Wadena
Marcum, E. H. Bemidji

Miller, W. A. New York Mills
Moyer, Ralph E. Bemidji
Nelson, Nesmith Brainerd
Ortman, John W. Pierz
Osburn, B. F. International Falls
Parrott, B. W. Long Prairie
Pengelly, E. J. Crosby
Pierce, Chas. H. Wadena
Ratcliffe, J. J. Aitkin
Reeves, C. E. Eagle Bend
Roberts, L. M. Little Falls
Rosenfeld, A. B. Pequot
Shannon, S. S. Crosby
Simons, Edwin J. Swanville
Smith, B. A. Crosby
Smith, E. H. Bemidji
Strader, E. L. Deerwood
Thabes, J. A. Brainerd
Thabes, John A., Jr. Brainerd
Van Valkenburg, B. F. Long Prairie
Van Valkenburg, F. W. Long Prairie
Watson, A. M. Royalton
Watson, John D. Holdingford
Wilcox, F. L. Walker
Will, W. W. Bertha
Williams, R. J. Pine River

WABASHA COUNTY MEDICAL SOCIETY

Annual meeting, first Thursday after first Monday in July.

President
Cochrane, W. J. Lake City

Secretary
Wilson, W. F. Lake City

Anderson, Arnold S. Wabasha
Bond, Joseph F. Wabasha
Bowers, H. E. Lake City
Cochrane, W. J. Lake City
Collins, J. S. Wabasha
Fleischhauer, D. S. Wabasha

Loney, William R. R. Plainview
Radabaugh, R. C. Hastings
Replogle, W. H. Wabasha
Stocumb, J. A. Plainview
Sutton, L. F. Mazeppa
Wilson, W. F. Lake City

WASECA COUNTY MEDICAL SOCIETY

Annual meeting, December 1.

President
McIntire, H. M. Waseca

Secretary
Swenson, O. J. Waseca

Bergman, O. B. St. James
Blanchard, H. G. Waseca
Hagen, H. O. New Richland
Leopard, B. A. New Richland
McIntire, H. M. Waseca

Miller, H. A. Waseca
O'Hara, J. J. Janesville
Swartwood, F. A. Waseca
Swenson, O. J. Waseca

WASHINGTON COUNTY MEDICAL SOCIETY

Regular meetings, second Tuesday of odd months.

Annual meeting, November.

President
Josewski, R. J. Stillwater

Secretary
Culver, Lucian G. Stillwater

Boleyn, E. S. Stillwater

Combacker, L. C. Fergus Falls
Culver, Lucian G. Stillwater
Haines, J. H. Stillwater
Humphrey, W. R. Stillwater
Josewski, R. J. Stillwater
Kalinoff, D. Stillwater
Landein, F. G. Stillwater

Poirier, J. A. Forest Lake
Rygh, E. A. Minneapolis
Sherman, Carnot H. Bayport
Sherwood, K. K. Stillwater
Stuhr, J. W. Stillwater
Thompson, V. C. Marine

WATONWAN COUNTY MEDICAL SOCIETY

Regular meetings, at call.

Annual meeting, December.

President
Hagen, O. E. Butterfield

Secretary
Grimes, H. B. Madelia

Bregel, Fred L. St. James
Grimes, H. B. Madelia
Hagen, O. E. Butterfield

Hefke, Hans W. St. James
McCarthy, W. J. Madelia
Thompson, Albert St. James

WEST CENTRAL MINNESOTA MEDICAL SOCIETY

Big Stone, Pope, Stevens and Traverse Counties

Regular meetings, January, April, July, October.

Annual meetings, second Wednesday in October.

President
Leland, John T. Herman

Secretary
Linde, Herman Cyrus

Arnson, J. M. Minneapolis
Bates, B. V. Browns Valley
Bergan, Otto Clinton
Bolsta, Chas. Ortonville

Caine, C. E. Morris
Christenson, C. R. Starbuck
Diesen, A. F. Starbuck
Eberlin, E. A. Glenwood
Else, J. R. Glenwood
Ewing, C. F. Wheaton
Gibbon, L. L. Lowry
Giers, S. W. Benson
Judge, Walter T. Graceville
Karn, B. R. Ortonville

Leland, John T. Herman
Leuty, Amos Morris
Lindberg, A. L. Wheaton
Linde, Herman Cyrus
O'Donnell, D. M. Ortonville
Oliver, C. I. Graceville
Pierson, Claude M. Wheaton
Shelver, H. J. Ortonville
Weir, J. D. Beardley

†Application for Emeritus or Honorary membership not completed.

WINONA COUNTY MEDICAL SOCIETY

Regular meetings, first Monday in January, April, July and October.

Annual meeting, first Monday in January.

President		Heise, W. F. C.	Winona	Neumann, C. A.	Lewiston
Adler, Stuart W.	Winona	Keyes, E. D.	Winona	Page, R. L.	St. Charles
Secretary		Leicht, O.	Winona	Pritchard, D. B.	Winona
Steiner, I. W.	Winona	Lichtenstein, H.	Winona	Risser, E. D.	Winona
Adler, Stuart W.	Winona	Lindsay, W. V.	Winona	Robbins, C. P.	Winona
Bear, H. C.	St. Charles	McDonnell, C. H.	Winona	Schaefer, S.	Winona
Benoit, F. T.	Winona	McLaughlin, E. M.	Winona	Schnarrenberger, G.	Winona
Clay, F. H.	St. Charles	Meinert, A. E.	Winona	Steiner, I. W.	Winona
		Moulton, A. B.	Lewiston	Tweedy, G. J.	Winona
		Nauth, W. W.	Winona	Walker, G. H.	Winona

WRIGHT COUNTY MEDICAL SOCIETY

Regular meetings, quarterly.

Annual meeting, October, first Tuesday after first Monday.

President		Freed, O. J. R.	Cokato	Phillips, A. E.	Delano
Klaveness, E.	Monticello	Harriman, L.	Howard Lake	Ridgway, A. M.	Annandale
Secretary		Klaveness, E.	Monticello	Roholt, C. L.	Waverly
Catlin, John J.	Buffalo	Lee, J. L.	Watertown	Rousseau, Victor	Maple Lake
Catlin, John J.	Buffalo	Moffat, A. G.	Howard Lake	Shrader, E. E.	Watertown
Ellison, Frank E.	Monticello	Norris, G. H.	Annandale	Swezey, B. F.	Buffalo
		Peterson, O. L.	Cokato	Thoresen, Thor	Oslo, Norway

ALPHABETICAL ROSTER

Aanes, A. M.	Red Wing	Baker, Alfred T.	Minneapolis	Bokenkamp, F. W.	Luverne
Abbott, J. S.	St. Paul	Baker, E. L.	Minneapolis	Bohland, E. H.	St. Paul
Abbott, Wm. F.	Duluth	Baker, Harry R.	Hayfield	Bohland, F. J. von	Belle Plaine
Aborn, W. H.	Hawley	Baker, Loee	Minneapolis	Bole, R. S.	St. Paul
Adair, F. L.	Minneapolis	Bakke, O. H.	Minneapolis	Bolyn, E. S.	Stillwater
Adams, B. S.	Hibbing	Bakkila, Henry	Duluth	Bolsta, Chas.	Ortonville
Adams, J. L.	Morgan	Balcome, F. E.	St. Paul	Bolstad, H. C.	St. Paul
Adams, R. C.	Bird Island	Baldwin, A. E.	Houston	Boman, P. G.	Duluth
Adams, R. T.	Mantorville	Balfour, D. C.	Rochester	Bomberger, C. B.	Mapleton
Adams, S. Franklin	Rochester	Ball, C. R.	St. Paul	Bond, Joseph F.	Wabasha
Adkins, C. M.	Grygla	Bannick, Edwin G.	St. Paul	Bong, J. H.	Jasper
Adler, Stuart W.	Winona	Barber, J. P.	Minneapolis	Bonta, M. B.	Rochester
Adson, A. W.	Rochester	Barborka, C. J.	Rochester	Booth, A. E.	Minneapolis
Affeldt, Daniel E.	Kasson	Bardon, Richard	Duluth	Boothby, W. M.	Rochester
Agnew, Allen T.	International Falls	Bargen, J. Arnold	Rochester	Boquist, E. T. W.	Minneapolis
Ahrens, A. E.	St. Paul	Barker, Nelson W.	Rochester	Boquist, Harold S.	Minneapolis
Ahrens, A. H.	St. Paul	Barnes, A. R.	Rochester	Boreen, C. A.	Minneapolis
Aitkens, H. B.	LeSueur Center	Barney, L. A.	Duluth	Borg, Joseph F.	St. Paul
Akester, Ward	Marshall	Barron, Moses	Minneapolis	Borgeson, Egbert J.	Minneapolis
Alberts, Max W.	St. Paul	Barry, L. W.	St. Paul	Borreson, Baldwin	Remer
Alden, J. F.	St. Paul	Barsness, Nellie	St. Paul	Bossingham, O. N.	Lake Benton
Aldes, Harry	St. Paul	Barton, E. R.	Minneapolis	Bottolfsen, B. T.	Morehead
Aldrich, F. H.	Bellevue	Basinger, H. P.	Windom	Bouma, L. R.	St. Paul
Alexander, Clifford E.	Duluth	Basinger, Harvey R.	Mountain Lake	Bouman, H. A.	Minneapolis
Alexander, F. H.	St. Paul	Bass, G. W.	Minneapolis	Bowen, Robert L.	Hibbing
Aling, C. P.	Minneapolis	Bates, B. V.	Browns Valley	Bowers, H. E.	Lake City
Allan, Frank N.	Rochester	Baumgartner, Conrad J.	Rochester	Bowers, J. T.	Thief River Falls
Allen, Chas. C.	Austin	Baxter, Geoffrey H.	Rochester	Bowing, H. H.	Rochester
Allen, Edgar V.	Rochester	Baxter, S. H.	Minneapolis	Bowles, John H.	Rochester
Allen, F. A.	Crosby	Bayha, Carl H.	Rochester	Boyer, S. H.	Duluth
Allen, F. H.	Staples	Beach, Watson	Rochester	Boysen, H.	Welcome
Allen, H. W.	Minneapolis	Beadie, W. D.	Cannon Falls	Boysen, Peter	Pelican Rapids
Allen, Mason	St. Paul	Beals, Hugh	St. Paul	Braasch, Wm. F.	Rochester
Allen, Roy W.	Rochester	Bear, H. C.	St. Charles	Brabec, F. J.	Perham
Allen, W. A.	Rochester	Beard, Archie H.	Minneapolis	Brabec, P. F.	Perham
Allison, R. G.	Minneapolis	Beard, R. O.	Minneapolis	Bracken, H. M.	Claremont, Cal.
Almquist, H. E.	Minneapolis	Bedford, E. W.	Minneapolis	Braden, A. J.	Duluth
Altnow, Hugo O.	Minneapolis	Beede, Ethel R.	Fairbault	Bradley, E. L.	Superior, Wis.
Alvarez, Walter C.	Rochester	Behmler, Fred W.	Appleton	Brand, G. D.	St. Paul
Amberg, Samuel	Rochester	Beise, R. A.	Brainerd	Brand, W. A.	Redwood Falls
Anderson, A. E.	Minneapolis	Bell, C. C.	St. Paul	Branham, D. S.	Albert Lea
Anderson, Arnold S.	Wabasha	Bell, E. T.	Minneapolis	Branton, A. F.	Willmar
Anderson, Arnt G.	Minneapolis	Bell, J. W.	Minneapolis	Branton, B. J.	Willmar
Anderson, C. E.	Brainerd	Belote, G. B.	Caledonia	Bratrud, A. F.	Minneapolis
Anderson, C. M.	Rochester	Benedict, E. E.	Minneapolis	Bratrud, O. Edward	Warren
Anderson, David D.	Minneapolis	Benedict, W. L.	Rochester	Bratrud, Theodor	Warren
Anderson, Edward D.	Minneapolis	Benepe, L. M.	St. Paul	Bratrude, E. J.	Rochester
Anderson, Ernest R.	Minneapolis	Benham, E. W.	Mankato	Braverman, N. J.	Duluth
Anderson, E. W.	Rochester	Benjamin, A. E.	Minneapolis	Bray, C. W.	Biwabik
Anderson, Hilding C.	Duluth	Benjamin, W. G.	Pipestone	Bray, E. R.	St. Paul
Anderson, J. K.	Crookston	Benn, F. G.	Minneapolis	Bregel, Fred L.	St. James
Anderson, Mark J.	Rochester	Bennion, P. H.	St. Paul	Briggs, F. W.	Duluth
Anderson, Norman E.	Harmony	Benoit, F. T.	Winona	Brigham, C. F.	St. Cloud
Anderson, R. E.	Atwater	Bentley, Norman P.	St. Paul	Brigham, Frank	Watkins
Anderson, S. H.	Red Wing	Berdez, G. L.	Duluth	Brimhall, J. B.	St. Paul
Anderson, Silas C.	Minneapolis	Bergan, Otto	Clinton	Broberg, J. A.	Blue Earth
Anderson, W. S.	Minneapolis	Bergh, L. N.	Montevideo	Brookbank, Thos. Wm.	Rochester
Andrews, J. W.	Mankato	Berghum, M. C.	Hawley	Broders, A. M.	Rochester
Andrews, R. N.	Mankato	Berglund, Hilding	Minneapolis	Brodie, Walter D.	St. Paul
Andrews, R. S.	Minneapolis	Bergman, O. B.	St. James	Broker, W. S.	Battle Lake
Annis, H. B.	Minneapolis	Bergquist, K. E.	Duluth	Brooks, Chas. N.	Minneapolis
Archibald, Frank M.	Mahnomen	Berkman, D. M.	Rochester	Brooks, D. F.	St. Paul
Arends, A. L.	St. Paul	Bernard, B. C.	Thief River Falls	Brooks, G. F.	St. Paul
Arey, H. C.	Excelsior	Berrisford, Paul D.	St. Paul	Brousseau, J. E.	Argyle
Arminen, K. V.	Duluth	Bertelson, O. L.	Crookston	Brown, A. E.	Rochester
Armstrong, E. L.	Duluth	Bessesen, A. N., Sr.	Minneapolis	Brown, A. H.	Pipestone
Armstrong, Harry G.	Minneapolis	Bessesen, Al. N., Jr.	Minneapolis	Brown, Edgar D.	Minneapolis
Armstrong, J. M.	St. Paul	Bessesen, Daniel H.	Minneapolis	Brown, Ed I.	St. Paul
Arnold, E. W.	Adrian	Bessesen, W. A.	Minneapolis	Brown, Edw. J.	Minneapolis
Arnold, James E.	Mapleton	Best, F. E.	Wells	Brown, Felix M.	Rochester
Arnquist, A. S.	St. Paul	Bianco, A. J.	Duluth	Brown, G. E.	Rochester
Arnsen, J. M.	Minneapolis	Biedermann, Jacob	Thief River Falls	Brown, John C.	St. Paul
Arouni, Khalil	St. Paul	Bigelow, C. E.	Dodge Center	Brown, Lyle L.	Crookston
Arvidson, C. G.	Minneapolis	Binet, H. E.	Grand Rapids	Brown, P. W.	Rochester
Arzt, C. P.	St. Paul	Binger, H. E.	St. Paul	Brown, S. E.	St. Paul
Athens, A. G.	Duluth	Binger, Melvin W.	Rochester	Browning, W. E.	Caledonia
Atkins, G. L.	Jackson	Birnberg, T. L.	St. Paul	Brunet, L. M.	River Rouge, Mich.
Aune, Martin	Minneapolis	Bishop, Chas. W.	Minneapolis	Brunsting, Louis A.	Rochester
Aurand, W. H.	Minneapolis	Bissell, F. S.	Minneapolis	Buck, Fred H.	Shakopee
Aurelius, I. Richards	St. Paul	Bjorgo, C. W.	Cannon Falls	Buie, L. A.	Rochester
Aurness, P. A.	Minneapolis	Black, Wm.	Mankato	Bulkley, Kenneth	Minneapolis
Ausman, Carl F.	St. Paul	Blackford, Launcelot M.	Rochester	Bullen, F. W.	Hibbing
Axilrod, D. L.	Minneapolis	Blacklock, S. S.	Hibbing	Bumpus, H. C.	Rochester
Ayres, G. T.	Ely	Blake, Jas.	Hopkins	Bunten, William A.	Rochester
Babcock, F. M.	Northfield	Blakely, C. C.	Barnum	Burch, F. E.	St. Paul
Backe, Edmond	Kenyon	Blakey, A. R.	Osakis	Burnd, G. H.	St. Paul
Bacon, Donald K.	St. Paul	Blanchard, H. G.	Waseca	Burling, Temple	Minneapolis
Bacon, Knox	San Diego, Calif.	Blaustone, Henry H.	Minneapolis	Burnap, W. L.	Fergus Falls
Bacon, L. C.	St. Paul	Blegen, H. M.	Warren	Burns, F. W.	St. Paul
Bacon, R. S.	Montevideo	Bliss, John H.	Rochester	Burns, H. D.	Albert Lea
Badeaux, G. I.	Brainerd	Block, Phoebe P.	Virginia	Burns, M. A.	Milan
Bagley, W. R.	Duluth	Blumenthal, Jacob	Minneapolis	Burns, R. L.	Two Harbors
Bailey, H. B.	Ceylon	Rock, R. A.	St. Paul	Burns, R. M.	St. Paul
Baken, Melvin P.	Minneapolis	Bockman, M. W. H.	Minneapolis	Burton, Carl G.	St. Paul
Baker, A. C.	Fergus Falls	Bodine, Marc W.	Rochester	Busby, James L.	Rochester
		Bockmann, Egil	St. Paul	Buscher, Julius	Albany
		Boehm, J. C.	St. Cloud	Busher, H.	St. Paul

†Application for Emeritus or Honorary membership not completed.

Butler, John	Minneapolis	Crafts, Leo M.	Minneapolis	Dunlap, E. H.	Minneapolis
Butturi, C. R.	Freeborn	Craig, C. C.	International Falls	Dunlap, H. F.	Rochester
Butz, J. A.	Montevideo	Craig, Wm. McK.	Rochester	Dunlop, Alex.	Crookston
Butzer, John A.	Mankato	Crane, Jacob F.	Rochester	Dunn, Geo. R.	Minneapolis
Byrnes, W. J.	Minneapolis	Cranmer, Richard R.	Minneapolis	Dunn, J. N.	St. Paul
		Creighton, Ralph H.	Minneapolis	Dunn, Louis	Minneapolis
		Cremer, M. H.	Red Wing	Dunne, Gerald P.	St. Paul
Cabot, George S.	Minneapolis	Crenshaw, J. L.	Rochester	Dunsmoor, F. A.	Minneapolis
Cabot, V. S.	Minneapolis	Cress, E. E.	Boyd	Durgin, F. L.	Winnebago
Caine, C. E.	Morris	Cress, P. J.	Ellsworth	Dutton, C. E.	Minneapolis
Caldwell, Jas. P.	St. Paul	Crewe, J. E.	Rochester	Dworsky, Samuel D.	Minneapolis
Caldwell, Kenneth S.	St. Paul	Critchfield, L. R.	St. Paul		
Caley, G. R.	Princeton	Crow, E. R.	Minneapolis		
Calhoun, F. W.	Albert Lea	Crump, J. W.	St. Paul	Earl, George A.	St. Paul
Callahan, F. F.	Pokegama	Culligan, J. M.	St. Paul	Earl, Robert O.	St. Paul
Callenstrom, G. W.	Minneapolis	Culver, Lucian G.	Stillwater	Eberlin, E. A.	Glenwood
Cameron, J. A.	St. Paul	Curtin, John F.	Minneapolis	Eby, C. B.	Spring Valley
Camp, W. E.	Minneapolis	Cutts, George	Minneapolis	Eckman, P. F.	Duluth
Campbell, J. E.	South St. Paul			Eckstein, A. W.	Comfrey
Campbell, L. M.	Minneapolis			Edlund, G.	St. Paul
Campbell, Robert	Minneapolis			Edstrom, Henry	Crookston
Cannon, Harry	St. Paul	Dack, Lloyd G.	St. Paul	Edwards, Ralph T.	Elysian
Cantwell, W. F.	International Falls	Dady, Elmer E.	Minneapolis	Egilsrud, Kristian	Minneapolis
Cardie, Archibald E.	Minneapolis	Dahl, Elmer O.	Minneapolis	Ehmke, Wm. C.	Willow River
Carey, Jas. B.	Minneapolis	Dahl, G. A.	Mankato	Ehrenberg, C. J.	Minneapolis
Carlaw, C. M.	Minneapolis	Dahl, John A.	Minneapolis	Eirley, Clara S. Y.	Mt. Pleasant, Ia.
Carlson, H. A.	Brainerd	Dahlquist, G. W.	Lancaster	Eisenman, W. G.	Chisholm
Carman, C. L.	St. Paul	Dahlstrom, A. W.	Minneapolis	Eitel, Geo. D.	Minneapolis
Carman, Paul I.	St. Paul	Daigault, Oscar	Benson	Eitel, G. G.	Minneapolis
Carmen, J. E.	Detroit Lakes	Dally, H. H.	Amboy	Ekblad, J. W.	Duluth
Caron, Robert P.	Minneapolis	Daniel, Donald H.	Minneapolis	Eklund, E. J.	Norwood
Carroll, Wm. C.	St. Paul	Daniel, Lewis M.	Minneapolis	Eklund, Wm. J.	Duluth
Carstens, C. E.	Hibbing	Daniels, Harry A.	Rochester	Elias, F. J.	Duluth
Carter, Fred G.	St. Paul	Daniels, J. W.	St. Peter	Ellingson, A. R.	Detroit Lakes
Catin, John J.	Buffalo	Danielson, K. A.	Litchfield	Ellison, David E.	Minneapolis
Cavanaugh, J. O.	St. Paul	Darling, J. B.	St. Paul	Ellison, Frank E.	Monticello
Caylor, Harold D.	Rochester	Dart, Leslie O.	Minneapolis	Eisey, J. R.	Glenwood
Cervenka, Charles F.	New Prague	Daugherty, E. B.	St. Paul	Ely, O. S.	South St. Paul
Chadbourne, A. G.	Heron Lake	Daugherty, L. E.	St. Paul	Emerson, E. C.	St. Paul
Chamberlain, H. E.	Minneapolis	Davis, Austin C.	Rochester	Empie, W. M.	Virginia
Chambers, W. C.	Blue Earth	Davis, B. F.	Duluth	Endress, E. K.	St. Paul
Chapman, T. L.	Duluth	Davis, F. U.	Faribault	Engberg, E. J.	St. Paul
Chatterton, C. C.	St. Paul	Davis, Herbert	St. Paul	Engb, Sigfred	Cottonwood
Cheleen, S. J.	Minneapolis	Davis, I. Grant	Rushford	Engstrand, Oscar J.	Warren
Cheney, E. L.	Duluth	Davis, John D.	Rochester	Eppard, R. M.	Cloquet
Cherry, Chas. H.	Minneapolis	Davis, L. Thomas	Wadena	Erb, F. A.	Minneapolis
Chesley, A. J.	Minneapolis	Davis, Thayer C.	Wadena	Erdmann, C. A.	Minneapolis
Chorest, J. C. R.	Marshall	Davis, William	St. Paul	Ericksen, L. G.	Wood Lake
Christensen, E. P.	Two Harbors	Davison, P. C.	Willmar	Erickson, J. L.	Twin Valley
Christenson, C. R.	Starbuck	Dean, Arthur C.	Crookston	Ericson, J. G.	Minneapolis
Christianson, A.	St. Paul	Dean, Benjamin F.	Rochester	Ericson, Swan	Le Sueur
Christianson, H. W.	Wykoff	DeBoer, Hermann	Edgerton	Ernest, G. C.	St. Paul
Christie, G. R.	Long Prairie	DeCarle, Donald W.	Rochester	Erpelding, J. K.	Adrian
Christie, R. L.	Long Prairie	Decker, Walter J.	Rochester	Ertel, E. Q.	Ellendale
Christison, J. T.	St. Paul	Dedolph, Karl	St. Paul	Esheby, E. C.	St. Paul
Chumley, Charles L.	Rochester	Delmore, J. L.	Roseau	Esser, John	Perham
Cirkler, A. A.	Minneapolis	Denman, A. V.	Mankato	Estrem, C. O.	Fergus Falls
Clark, D. M.	Pine City	Derauf, B. I.	St. Paul	Estrem, T. A.	Hibbing
Clark, F. F.	Duluth	Desjardins, Arthur U.	Rochester	Etheredge, Shuler H.	Rochester
Clark, H. S.	Minneapolis	Devereaux, T. G.	Weyzata	Eubanks, George F.	Rochester
Clark, T. C.	Minneapolis	Dewey, G. W.	Goodhue	Eusterman, G. B.	Rochester
Clay, F. H.	St. Charles	Dezell, Earl R.	Minneapolis	Evans, Edward T.	Minneapolis
Claydon, L. E.	Red Wing	Deziel, G.	Minneapolis	Evarts, Arrah B.	Rochester
Clement, J. B.	Lester Prairie	Dickson, Thos. H., Jr.	St. Paul	Everlof, J. L.	Minneapolis
Clement, T. G.	Duluth	Diehl, Harold S.	Minneapolis	Ewens, H. B.	Virginia
Clifford, F. F.	West Concord	Diesen, A. F.	Starbuck	Ewing, C. F.	Wheaton
Cobb, Willis F.	Lyle	Diessner, H. D.	Minneapolis		
Cochrane, W. J.	Lake City	Disen, C. F.	Minneapolis	Fahey, E. W.	St. Paul
Colby, J. Woodard	St. Paul	Ditmore, David C.	Rochester	Fansler, W. A.	Minneapolis
Cole, H. B.	Redwood Falls	Dittman, Geo. C.	St. Paul	Farabaugh, Charles L.	Minneapolis
Cole, Wallace H.	St. Paul	Dixon, Claude F.	Rochester	Farr, R. E.	Minneapolis
Coleman, F. B.	Austin	Dixon, Robert K.	Rochester	Farrell, J. C.	Arlington
Collie, H. G.	St. Paul	Dodge, F. A.	LeSueur	Farrish, R. C.	Sherburn
Collins, A. N.	Duluth	Dohm, A. J.	St. Paul	Faust, Louis S.	Rochester
Collins, H. C.	Duluth	Dolan, C. P.	Worthington	Fawcett, C. E.	Stewartville
Collins, J. S.	Wabasha	Dolder, F. C.	Eyota	Feeney, John M.	Minneapolis
Colvin, A. R.	St. Paul	Doms, H. C.	Slayton	Fehland, Harold R.	Rochester
Combacher, L. C.	Fergus Falls	Doms, Wm.	Woodstock	Ferguson, J. C.	St. Paul
Comfort, Manfred W.	Rochester	Donaldson, C. A.	Chandler, Ariz.	Ferreira, Gideon J.	Duluth
Comstock, A. E.	St. Paul	Donohue, P. F.	St. Paul	Fesler, Harold H.	St. Paul
Condit, W. H.	Minneapolis	Doolittle, L. E.	Duluth	Figi, F. A.	Rochester
Conley, Alva A.	Cannon Falls	Dordal, J.	Sacred Heart	Fiskdal, M. J.	Willmar
Conner, H. M.	Rochester	Dorge, Richard J.	Minneapolis	Fink, Walter H.	Minneapolis
Conner, Wm. H.	Minneapolis	Dowsell, W. J.	Kerkhoven	Finney, W. P., Jr.	Rochester
Connor, C. E.	St. Paul	Doxey, G. L.	Minneapolis	Fischer, G.	Minneapolis
Cook, Henry Wireman	Minneapolis	Doyle, George C.	Duluth	Fischer, H. P.	Shakopee
Cook, Jay M.	Staples	Doyle, J. B.	Rochester	Fischer, Mario McC.	Duluth
Cook, Paul B.	St. Paul	Drake, Carl B.	St. Paul	Fischer, P. M.	Shakopee
Cooney, H. C.	Princeton	Drake, C. R.	Minneapolis	Fishback, Frederick C.	Rochester
Cooper, M. D.	Winnebago City	Drake, F. A.	Lanesboro	Fitzgerald, D.	Minneapolis
Cooperman, H. O.	Minneapolis	Dredge, H. P.	Sandstone	Fieldstad, C. A.	Minneapolis
Corbeille, Catherine	Rochester	Dreisbach, N.	Minneapolis	Fiellman, R. C.	Minneapolis
Corbett, J. Frank	Minneapolis	Drenning, F. C.	Duluth	Flagstad, A. E.	St. Paul
Corrigan, J. A.	Spokane	Drips, D. G.	Rochester	Flancher, Leon H.	Lake Park
Cosgriff, J. E.	North Mankato	Drought, W. W.	Fergus Falls	Fleischhauer, D. S.	Wabasha
Cosgrove, J. H.	Duluth	Dubbe, F. H.	New Ulm	Fleming, A. S.	Minneapolis
Cosman, E. O.	Minneapolis	DuBois, J. A.	Sauk Center	Fleming, James	Cloquet
Countryman, Roger S.	St. Paul	DuBois, J. F.	Sauk Center	Flinn, B. P.	Redwood Falls
Covell, W. W.	St. Peter	Dudley, J. H.	Windom	Flinn, T. E.	Redwood Falls
Coveny, W. A.	Duluth	Dulude, S.	Dassel	Flom, A. O.	Chicago City
Cowern, F. W.	North St. Paul	Duncan, Henry	Marietta	Flores, O. T.	Dodge Center
Cowing, P. G.	Evansville	Dungay, Neil S.	Northfield		

*Member deceased.

†Application for Emeritus or Honorary membership not completed.

Flothow, Paul G. Rochester
 Flower, W. Z. Minneapolis
 Fogarty, Chas. W. St. Paul
 Foley, F. E. B. St. Paul
 Folken, F. G. Albert Lea
 Forbes, R. S. Duluth
 Ford, Burton C. Marshall
 Ford, Frances A. Rochester
 Forrest, C. G. Clearbrook
 Fortin, Harry J. Rochester
 Foshager, Henry T. Clara City
 Foster, Wilnot C. Rochester
 Foster, W. K. Minneapolis
 Fowler, L. H. Minneapolis
 Fox, Ben. Rochester
 Fox, John M. Minneapolis
 Franchere, F. W. Lake Crystal
 Francis, David W. Morristown
 Fredrickson, Alice C. Lake Lillian
 Fredrickson, Guy V. Y. Lake Lillian
 Fredrickson, Clyde H. Rochester
 Freeborn, J. A. Fergus Falls
 Freed, O. J. R. Cokato
 Freeman, C. D. St. Paul
 Freeman, G. H. St. Peter
 Freeman, J. F. Albert Lea
 Freeman, W. L. St. Cloud
 Freleigh, W. P. Albert Lea
 French, H. S. New London
 Freymiller, E. F. Markville
 Fried, Louis A. Ada
 Friedell, A. Minneapolis
 Friesleben, Wm. Sauk Rapids
 Fritsche, Albert. New Ulm
 Fritsche, L. A. New Ulm
 Froelich, H. W. Thief River Falls
 Frost, E. H. St. Willmar
 Frost, Harry T. Wadena
 Frudenfeld, H. H. Minneapolis
 Fugina, George R. Mankato
 Fulton, J. F. St. Paul
 Funk, Victor K. Oak Terrace

Gaarde, F. W. Rochester
 Gager, E. C. St. Paul
 Gages, E. C. Buffalo Lake
 Gallagher, B. J. St. Cloud
 Gamble, J. W. Albert Lea
 Gamble, P. M. Albert Lea
 Gamble, R. M. Albert Lea
 Gammell, J. H. Minneapolis
 Garand, J. H. Dayton
 Garbrecht, Arthur. St. Paul
 Gardner, D. G. St. Paul
 Gardner, Edwin L. Minneapolis
 Gardner, R. D. Eveleth
 Gardner, V. H. Fairmont
 Garlock, A. V. Bemidji
 Garlock, Dewitt H. Bemidji
 Gates, C. E. Anoka
 Gates, Russell. Minneapolis
 Gault, C. W. Owatonna
 Gauthier, W. L. St. Paul
 Gay, James G. Rochester
 Geer, Everett K. St. Paul
 Gehlen, J. N. St. Paul
 Geissenger, John D. St. Paul
 Geist, Emil S. Minneapolis
 Geist, George A. St. Paul
 Gelz, J. J. St. Cloud
 Gerber, Milo P. Brainerd
 Gerho, Chas. Balaton
 Ghent, C. Harry. St. Paul
 Ghent, M. M. St. Paul
 Ghostley, Mary C. International Falls
 Gibbon, L. L. Lowry
 Giere, E. O. St. Paul
 Giere, S. W. Benson
 Giessler, Paul W. Minneapolis
 Giffin, H. Z. Rochester
 Gilfillan, J. S. St. Paul
 Gilles, F. M. Minneapolis
 Gillespie, M. G. Duluth
 Gillespie, N. H. Duluth
 Gilmore, Rowland. Bemidji
 Gingold, Benjamin A. Minneapolis
 Ginsberg, Wm. St. Paul
 Gleason, Notary A. Rochester
 Goblirsh, A. P. Sleepy Eye
 Goeckerman, W. H. Rochester
 Goldberg, Isadore M. Minneapolis
 Golden, C. M. Tyler
 Goltz, E. V. St. Paul
 Good, Louis P. Rochester
 Good, Ralph W. Rochester
 Gorder, Arne C. Rochester
 Gordon, Geo. J. Minneapolis
 Gosin, D. F. Minneapolis
 Gosslee, G. L. Moorhead
 Gowan, L. R. Duluth
 Graham, A. Stephens. Rochester

Graham, David. Duluth
 Graham, R. D. Duluth
 Graham, Robert. Duluth
 Gratzek, Thos. St. Paul
 Grave, Floyd. Minneapolis
 Grawn, F. A. Duluth
 Gray, F. D. Marshall
 Gray, Royal C. Minneapolis
 Greeley, L. Q. Duluth
 Green, E. K. Minneapolis
 Green, George F. Rochester
 Greene, Carl H. Rochester
 Greene, Charles L. St. Paul
 Greene, Earle I. Rochester
 Greene, W. P. Minneapolis
 Greenlee, Daniel P. Rochester
 Greisheimer, Esther M. Minneapolis
 Grier, James P. Rochester
 Griffin, P. J. Fertile
 Grimes, H. B. Madelia
 Grinnell, W. B. Preston
 Grise, W. B. Austin
 Groebner, O. A. Cold Spring
 Grogan, J. S. Wadena
 Groschupf, Theo. P. Bemidji
 Grose, Fredk. N. Bertha
 Ground, H. T. Virginia
 Gruenhagen, Arnold P. St. Paul
 Gulde, W. C. St. Cloud
 Gullixson, A. Albert Lea
 Gunderson, Nels A. Minneapolis
 Guyer, L. G. Staten Island, N. Y.

Habein, Harold C. Rochester
 Haberman, E. Osakis
 Hacking, Frank H. Minneapolis
 Haessley, S. B. Faribault
 Hagaman, Geo. K. St. Paul
 Hagen, G. L. Minneapolis
 Hagen, H. O. New Richland
 Hagen, O. E. Butterfield
 Hagen, Olaf J. Moorhead
 Hager, Benjamin H. Rochester
 Haggard, G. D. Minneapolis
 Haines, J. H. Stillwater
 Haines, S. F. Rochester
 Haldeman, Keene O. Rochester
 Halenbeck, Philip L. St. Cloud
 Hall, Andrea E. Virginia
 Hall, A. R. St. Paul
 Hall, E. L. Princeton
 Hall, Henry H. St. Paul
 Hall, J. M. Minneapolis
 Hall, S. S. Minneapolis
 Hallenbeck, D. F. Rochester
 Halloran, Walter. Jackson
 Halper, Philip. St. Paul
 Hamel, Arnold L. Minneapolis
 Hamilton, A. S. Minneapolis
 Hamlin, George B. Minneapolis
 Hammermeister, Theodore F. New Ulm
 Hammes, E. M. St. Paul
 Hammond, A. J. Minneapolis
 Hammond, Paul E. St. Paul
 Hamrick, Robert A. Rochester
 Hand, John R. Rochester
 Hand, W. R. Elbow Lake
 Hane, Richard L. Rochester
 Haney, C. L. Duluth
 Hanlon, Frank R. Rochester
 Hannah, Hewitt B. Minneapolis
 Hansen, Elmer H. Minneapolis
 Hansen, Erling. Minneapolis
 Hansen, M. Ada
 Hanseth, Olga S. Minneapolis
 Hanson, A. M. Faribault
 Hanson, H. J. Minneapolis
 Hanson, H. V. Minneapolis
 Hare, E. R. Minneapolis
 Harmon, G. E. St. Paul
 Harriman, L. Howard Lake
 Harrington, C. D. Minneapolis
 Harrington, Ethel R. Rochester
 Harrington, F. E. Minneapolis
 Harrington, S. W. Rochester
 Harris, C. N. Chisholm
 Harrison, E. E. West Concord
 Hart, Alfred B., Jr. Owatonna
 Hartiel, Wm. F. St. Paul
 Hartley, E. C. St. Paul
 Hartman, H. R. Rochester
 Hartwell, Shattuck W. Rochester
 Hartzell, John B. Rochester
 Hartzell, Thos. B. Minneapolis
 Haskell, A. D. Alexandria
 Haskins, John L. Northfield
 Hassett, Roger G. Bird Island
 Hastings, D. R. Minneapolis
 Hatch, W. E. Duluth
 Hathaway, J. C. Minneapolis
 Hauge, M. M. Clarkfield
 Hauser, Emil D. Rochester

Hauser, V. P. St. Paul
 Havens, Fred Z. Rochester
 Haverfield, Addie R. Minneapolis
 Hawkins, V. J. St. Paul
 Hawkinson, L. F. Brainerd
 Hayes, J. M. Minneapolis
 Hayes, M. F. Nashua
 Haynes, A. L. Faribault
 Head, G. D. Minneapolis
 Healy, R. T. Pierz
 Hearn, Wm. O. Minneapolis
 Heath, A. C. St. Paul
 Hebeisen, M. B. Carver
 Heck, Frank J. Rochester
 Heck, Wm. W. St. Paul
 Hedback, A. E. Minneapolis
 Hedenstrom, F. G. St. Paul
 Hedenstrom, L. H. Cambridge
 Hefke, Hans W. St. James
 Hegge, C. A. Austin
 Hegge, O. H. Austin
 Heiberg, E. A. Fergus Falls
 Heim, Russell R. Minneapolis
 Heimark, J. H. Moorhead
 Heimark, O. E. Duluth
 Heimdal, Clarence O. Rochester
 Hette, W. F. C. Winona
 Helk, H. H. Minneapolis
 Helland, G. M. Spring Grove
 Helland, J. W. Spring Grove
 Helmholtz, H. F. Rochester
 Hempstead, B. E. Rochester
 Hemstead, Werner. St. Cloud
 Hench, Philip S. Rochester
 Henderson, A. J. Kiester
 Henderson, Earl F. Rochester
 Henderson, M. S. Rochester
 Hendrickson, J. F. Minneapolis
 Hengstler, W. H. St. Paul
 Henney, Wm. H. McIntosh
 Henriksen, H. G. Elkton
 Henry, C. E. Minneapolis
 Henry, Myron O. Minneapolis
 Hensel, C. N. St. Paul
 Henslin, A. E. Le Roy
 Herbst, Wm. P. Minneapolis
 Herman, Arthur L. Minneapolis
 Hermann, Peter E. Ivanhoe
 Herrmann, Edgar T. St. Paul
 Hermann, S. F. Rochester
 Hertel, G. E. Austin
 Hesselgrave, S. S. St. Paul
 Hewson, Wilfred J. Stillwater
 Heyerdale, O. C. Rochester
 Hiebert, J. F. Minneapolis
 Higbee, Paul A. Minneapolis
 Higgins, J. H. Minneapolis
 Hilbert, Eunice. Minneapolis
 Hilger, A. W. St. Paul
 Hilger, D. D. St. Paul
 Hilger, J. M. Iona
 Hilger, L. A. St. Paul
 Hill, Eleanor J. Minneapolis
 Hill, Frederick E. Duluth
 Hilton, J. M. Brownville
 Hiniker, Louis P. St. Paul
 Hirschboeck, F. J. Duluth
 Hirschfelder, A. D. Minneapolis
 Hirschfield, M. S. Duluth
 Hirschfield, F. R. Minneapolis
 Hitchings, W. S. Lake Park
 Hoaglund, A. W. Minneapolis
 Hobbs, C. A. Minneapolis
 Hochfizer, J. J. St. Paul
 Hodapp, R. J. Willmar
 Hodge, S. V. Minneapolis
 Hodgson, H. H. Crookston
 Hoff, Alfred. St. Paul
 Hoffman, Max H. St. Paul
 Hoidale, A. D. Tracy
 Hoiland, A. S. Minneapolis
 Holbrook, J. S. Mankato
 Holcomb, I. T. St. Paul
 Holcomb, O. W. St. Paul
 Holen, T. Minneapolis
 Holl, P. M. Minneapolis
 Hollands, W. H. Fisher
 Holloway, Jackson K. Rochester
 Holm, C. E. Isle
 Holm, Geo. A. Minneapolis
 Holm, H. H. Glencoe
 Holm, P. F. Wells
 Holman, C. J. Mankato
 Holmberg, L. J. Canby
 Holmes, A. E. Rush City
 Holmes, W. B. Ada
 Holst, C. F. Little Falls
 Holst, J. B. Little Falls
 Holt, W. B. Minneapolis
 Holtan, Theodore. Waterville
 Horton, Bayard T. Crookston

*Member deceased.

Hodwitz, Alec.....	Rochester	Kelly, John V.....	St. Paul	Lee, W. A.....	Fergus Falls
House, Z. E.....	Cass Lake	Kelly, Paul H.....	St. Paul	Lee, W. P.....	Northfield
Houston, C. A.....	Park Rapids	Kelsey, C. G.....	Hinckley	Lee, Walter N.....	Madison
Hovde, H.....	Duluth	Kemp, A. F.....	Mankato	Leebens, J. H.....	Lismore
Howard, M. I.....	Mankato	Kendahl, A. M.....	Jasper	Leibold, H. H.....	Parkers Prairie
Howard, W. S.....	St. Paul	Kennedy, C. C.....	Minneapolis	Leicht, O.....	Winona
Huenekens, E. J.....	Minneapolis	Kennedy, Jane F.....	Minneapolis	Leitch, Archibald.....	St. Paul
Huffman, Lester D.....	Rochester	Kennedy, R. Roy.....	Minneapolis	Leitch, N. M.....	Worland
Hughes, Louis D.....	Minneapolis	Kennedy, Roger L. J.....	Rochester	Leland, Harold R.....	Minneapolis
Hultkrans, Joel C.....	St. Paul	Kennedy, W. A.....	St. Paul	Leland, John T.....	Herman
Hultkrans, R. E.....	Rush City	Kenny, H. F.....	St. Paul	Leland, M. N.....	Minneapolis
Humphrey, E. W.....	Moorhead	Kenyon, Paul.....	Wadena	Lemon, W. S.....	Rochester
Humphrey, W. R.....	Stillwater	Kepler, Edwin J.....	Rochester	Lemstrom, Jarl.....	Minneapolis
Hunt, F. N.....	Fairmont	Kepler, Helen M.....	Rochester	Lenander, Melvin E.....	St. Peter
Hunt, H. E.....	St. Paul	Kerlan, M.....	Bemidji	Lenort, C. B.....	Virginia
Hunt, R. C.....	Fairmont	Kerlan, S. Z.....	Aitkin	Leonard, Gilbert J.....	St. Paul
Hunt, V. C.....	Rochester	Kern, M. J.....	St. Cloud	Leonard, L. J.....	Minneapolis
Hunte, A. F.....	Truman	Kernohan, James W.....	Rochester	Leopard, B. A.....	New Richland
Hursh, M. M.....	Grand Rapids	Kertesz, G.....	Arlington	Lepak, F. J.....	Duluth
Hutchinson, Chas. J.....	Minneapolis	Kestel, John L.....	Rochester	Lepak, John A.....	St. Paul
Hutterer, Edw. G.....	Winsted	Kesting, Herman.....	St. Paul	Lerche, William.....	St. Paul
Huxley, F. R.....	Faribault	Keyes, C. R.....	Duluth	Leuty, Amos.....	Morris
Hynes, James.....	Minneapolis	Keyes, E. D.....	Winona	Lewis, A. J.....	Henning
Hynes, John E.....	Minneapolis	Kibbe, O. A.....	Minneapolis	Lewis, C. B.....	St. Cloud
Ide, A. W.....	St. Paul	Kiefer, M. A.....	Sleepy Eye	Lewis, Charles F.....	Austin
Ikeda, Kano.....	Minneapolis	Kierland, P. E.....	Alexandria	Lewis, W. W.....	St. Paul
Irvine, H. G.....	Minneapolis	Kiesling, I. H.....	Nashauk	Lexa, F. J.....	Lonsdale
Jackson, C. M.....	Minneapolis	Kilbourne, A. F.....	Rochester	Libert, John N.....	St. Cloud
Jacobs, A. C. J.....	Elmore	Kilbride, E. A.....	Worthington	Lichtenstein, H.....	Winona
Jacobs, Jno. C.....	Willmar	Kilbride, J. S.....	Canby	Lick, C. Louis.....	St. Paul
Jacobs, Miner F.....	Rochester	Kimball, H. H.....	Minneapolis	Liedloff, A. G.....	Mankato
Jacobson, Clarence.....	Kimball	King, E. A.....	Minneapolis	Light, S. E.....	St. Paul
Jacobson, David J.....	Blackduck	King, George L.....	St. Paul	Lillie, H. I.....	Rochester
Jacquot, G. L.....	Marshall	King, Harry T.....	Minneapolis	Lillie, W.....	Rochester
James, J. H.....	Mankato	King, W. R.....	Minneapolis	Lima, Ludvig.....	Montevideo
Jamieson, Earl.....	Walnut Grove	King, W. S.....	Eveleth	Lind, C. J.....	Minneapolis
Jennings, Mary H.....	Minneapolis	King, Z. P.....	St. Paul	Lindberg, A. L.....	Wheaton
Jensen, Louis C.....	Minneapolis	Kinsella, Thomas J.....	Oak Terrace	Linde, Herman.....	Cyrus
Jensen, M. J.....	Minneapolis	Kirk, G. P.....	East Grand Forks	Lindgren, E. I.....	Duluth
Jensen, T. J.....	Duluth	Kistler, A. J.....	Minneapolis	Lindquist, R. H.....	Minneapolis
Jenson, A. H.....	Hutchinson	Kistler, A. S.....	St. Paul	Lindsay, W. V.....	Winona
Johnson, A. E.....	Minneapolis	Kistler, C. M.....	Minneapolis	Linner, H. P.....	Minneapolis
Johnson, A. E.....	Red Wing	Kittelson, T. N.....	Fergus Falls	Linton, W. B.....	Rochester
Johnson, A. Elof.....	Minneapolis	Klavens, E.....	Monticello	List, Walter E.....	Minneapolis
Johnson, Asa M.....	St. Paul	Klein, Harry.....	Duluth	Litchfield, John T.....	Minneapolis
Johnson, C. M.....	Dawson	Klein, H. N.....	St. Paul	Litman, Samuel N.....	Duluth
Johnson, E. W.....	Bemidji	Kleinheksel, John L.....	Rochester	Little, W. J.....	St. Paul
Johnson, Ellsworth.....	Windom	Klima, W. W.....	Stewart	Litzenberg, J. C.....	Minneapolis
Johnson, Hans.....	Kerlshoven	Kliman, Frank E.....	Duluth	Lloyd, H. J.....	Mankato
Johnson, Hartland C.....	St. Paul	Knapp, F. N.....	Duluth	Locken, O. E.....	Crookston
Johnson, H. M.....	Dawson	Knauff, M. K.....	St. Paul	Logan, A. H.....	Rochester
Johnson, H. P. J.....	Fairmont	Knight, H. L.....	Minneapolis	Logan, F. W.....	Blue Earth
Johnson, James A.....	Minneapolis	Knight, Ralph T.....	Minneapolis	Logeile, Rudolph C.....	Minneapolis
Johnson, Julius.....	Minneapolis	Knight, Ray R.....	Minneapolis	Lommer, P. A.....	Austin
Johnson, Nimrod A.....	Minneapolis	Koch, John C.....	Minneapolis	Loney, William R. R.....	Plainview
Johnson, Norman.....	Minneapolis	Kohlbray, C. O.....	Duluth	Long, Jesse.....	Minneapolis
Johnson, Odin J.....	Minneapolis	Kohler, D. W.....	St. Joseph	Loofbourrow, Elias H.....	Keewatin
Johnson, O. V.....	Sebeka	Kohler, F. G.....	Minneapolis	Loomis, E. A.....	Minneapolis
Johnson, R. V.....	Minneapolis	Kohler, G. A.....	Minneapolis	Love, Fred A.....	Carlos
Johnson, Ray G.....	St. Paul	Koller, Herman M.....	Minneapolis	Lowe, Earl R.....	South St. Paul
Johnson, Selmer M.....	Minneapolis	Koller, L. R.....	Minneapolis	Lowe, Thomas.....	South St. Paul
Johnson, T. H.....	St. Paul	Kolset, Carl D.....	Sanborn	Lowe, Thos.....	Pineau
Johnson, Walfred.....	Sauk Center	Kooker, Herman J.....	Albert Lea	Luder, Georgine.....	Rochester
Johnson, Walter R.....	Rochester	Kraft, Peter.....	Duluth	Luedtke, G. H.....	Fairmont
Jones, A. W.....	Red Wing	Kremer, Walter J.....	Minneapolis	Lum, C. E.....	Duluth
Jones, D. C.....	St. Paul	Kriedt, Daniel.....	Minneapolis	Lund, Arthur E.....	St. Paul
Jones, E. M.....	St. Paul	Kucera, Frank J.....	Hopkins	Lundgren, A. C.....	Minneapolis
Jones, G. M.....	Minneapolis	Kucera, Wm. J.....	Minneapolis	Lundholm, A. M.....	St. Paul
Jones, H. T.....	Rochester	Kuhlman, Aug.....	Melrose	Lundquist, E. F.....	Minneapolis
Jones, H. W.....	Minneapolis	Kuskke, A. L.....	New Ulm	Lundy, John S.....	Rochester
Jones, Richard N.....	Richmond	Kuth, J. R.....	Duluth	Lynch, M. J.....	Minneapolis
Jones, Robert D.....	Rochester	Kvitrud, G.....	St. Paul	Lynn, John A.....	Minneapolis
Jones, W. A.....	Minneapolis	Laird, A. T.....	Nopeming	Lyon, E. P.....	Minneapolis
Jordan, Elverse M.....	Rochester	Lajoie, John M.....	Minneapolis	Lyon, J. D.....	Minneapolis
Jordan, Ferdinand M.....	Rochester	Landeau, F. G.....	Stillwater	Lysne, Henry.....	Minneapolis
Josewich, Alexander.....	Minneapolis	Laney, R. L.....	Puposky	McBeath, Ewing C.....	New York City
Josewski, R. J.....	Stillwater	Langenderfer, F. V.....	St. Paul	McBroom, D. E.....	Faribault
Joyce, G. T.....	Rochester	Langhoff, A. H.....	Glencoe	McCann, D. F.....	Bemidji
Judd, E. S.....	Rochester	Lannin, J. C.....	Mabel	McCann, James C.....	Rochester
Judge, Walter T.....	Graceville	Lapierre, C. A.....	Minneapolis	McCarthy, Donald.....	Minneapolis
Jurgens, H. M.....	Belle Plaine	Larsen, C. L.....	St. Paul	McCarthy, W. I.....	Madelia
Juliar, R. O.....	St. Clair	Larsen, O. O.....	Detroit Lakes	McCarthy, W. R.....	St. Paul
Kaasa, L. J.....	Albert Lea	Larson, A. L.....	Fertile	McCartney, James S.....	Minneapolis
Kadesky, David.....	St. Paul	Larson, Clarence M.....	Minneapolis	McCarty, P. D.....	Ely
Kahala, Arthur.....	Crookston	Larson, L. M.....	St. Paul	McClanahan, I. H.....	White Bear Lake
Kalinoff, D. A.....	Stillwater	Laughlin, J. T.....	Grey Eagle	McClanahan, T. S.....	White Bear Lake
Kamman, Gordon R.....	St. Paul	Laurent, A. A.....	Minneapolis	McCloud, C. N.....	St. Paul
Kamp, B. A.....	Albert Lea	LaVake, R. T.....	Minneapolis	McComb, C. F.....	Duluth
Kannary, E. L.....	St. Paul	Law, A. A.....	Minneapolis	McCoy, Mary.....	Duluth
Kanne, C. W.....	Faribault	Lax, Morris H.....	St. Paul	McCrea, James.....	Fulda
Karn, B. R.....	Ortonville	Lazar, H. L.....	Minneapolis	McCuskev, Charles F.....	Rochester
Kaufman, A. J.....	Franklin	Leahy, Bartholomew.....	St. Paul	McDaniel, Orianna.....	Minneapolis
Kaufman, Wm. C.....	Appleton	Leavenworth, Richard O.....	St. Paul	McDaniel, S. P.....	Mountain Iron
Kean, N. D.....	Coleraine	Leavitt, H. H.....	Minneapolis	McDonald, A. L.....	Duluth
Keith, N. M.....	Rochester	Lebowski, Jos. A.....	Minneapolis	McDonell, C. H.....	Winona
Kelling, Louis F.....	Lakefield	Leck, Clifford C.....	Austin	McDowell, J. P.....	St. Cloud
Kelly, B. W.....	Aitkin	LeClere, J. E.....	Le Sueur	McFarland, A. H.....	Minneapolis
		Leddy, Eugene T.....	Rochester	McGandy, R. F.....	Minneapolis
		Lee, H. M.....	Minneapolis	McGeary, Geo. E.....	Minneapolis
		Lee, J. L.....	Watertown		

†Application for Emeritus or Honorary membership not completed.

Phelps, Kenneth A.	Minneapolis	Roehlke, A. B.	Elk River	Shaw, A. W.	Buhl
Phelps, R. M.	Faribault	Rogers, John T.	St. Paul	Shedlov, A. E.	Fosston
Phillips, A. E.	Delano	Robolt, C. L.	Waverly	Sheddy, Chester L.	Austin
Phillips, W. H.	Jordan	Rohwer, Christian J.	Cleveland, Ohio	Sheldon, W. D.	Rochester
Pierce, Chas. H.	Wadena	Rood, D. C.	Duluth	Shelland, J. T.	Ada
Pierson, Claude M.	Wheaton	Rose, J. T.	Lakefield	Shellman, John L.	St. Paul
Pilon, P. C.	Paynesville	Rosen, S.	Minneapolis	Shelver, H. J.	Ortonville
Pineo, W. B.	Minneapolis	Rosenberg, Maurice N.	Minneapolis	Sheppard, Fred	Hutchinson
Piper, M. C.	Rochester	Rosenfeld, A. B.	Pegot	Sheppard, F. E.	Hutchinson
Piper, Wm. A.	Mountain Lake	Rosenholtz, Burton	St. Paul	Sherman, C. L.	Bayport
Plankers, A. G.	Dubuque, Iowa	Rosenow, E. C.	Rochester	Sherman, H. T.	Franklin
Platou, E. S.	Minneapolis	Rosenthal, Robert	St. Paul	Sherping, O. Th.	Fergus Falls
Plonske, C. J.	Faribault	Rosenwald, R. M.	Minneapolis	Sherwood, G. E.	Kimball
Plummer, H. S.	Rochester	Rothenburg, J. C.	Springfield	Sherwood, K. K.	Stillwater
Plummer, W. A.	Rochester	Rothrock, J. L.	St. Paul	Shillington, M. A.	St. Paul
Poirier, J. A.	Forest Lake	Rothschild, H. J.	St. Paul	Shippey, Stuart H.	Rochester
Pollard, D. W.	Crosby	Rousseau, Victor	Maple Lake	Shrader, E. E.	Watertown
Pollock, L. W.	Rochester	Roust, H. A.	Ruthon	Shrader, J. S.	Springfield
Polzak, Jacob A.	Minneapolis	Rowe, O. W.	Duluth	Shrugue, John J.	Rochester
Pope, Charles E.	Rochester	Rowe, Paul H.	Minneapolis	Simson, C. W.	Hawley
Pope, Fred H.	Minneapolis	Rowntree, L. G.	Rochester	Simon, B. F.	St. Paul
Power, J. E.	Duluth	Roy, J. A.	Red Lake Falls	Simon, Harold E.	Rochester
Prangen, A. D.	Rochester	Roy, Philemon	St. Paul	Simons, Bern. H.	Chaska
Pratt, Fred J.	Minneapolis	Rucker, Charles W.	Rochester	Simons, Edwin J.	Swanville
Pratt, J. A.	Minneapolis	Rucker, William H.	Minneapolis	Simons, Jalmar	Minneapolis
Preine, I. A.	Minneapolis	Rudell, Gustave	Minneapolis	Simpson, E. D.	Minneapolis
Prendergast, H. J.	St. Paul	Rudie, P. S.	Duluth	Simpson, J. D.	Minneapolis
Prickman, Louis E.	Rochester	Rubberg, George N.	St. Paul	Siperstein, D. M.	Minneapolis
Prim, J. A.	Minneapolis	Rumpf, C. W.	Faribault	Sistrunk, W. E.	Rochester
Pritchard, D. B.	Winona	Rumpf, William H.	Minneapolis	Sivertsen, Andrew	Minneapolis
Proshak, Charles E.	Minneapolis	Rutherford, W. C.	St. Paul	Sivertsen, Ivar	Minneapolis
Prout, Curtis T.	Rochester	Rutledge, L. H.	Detroit Lakes	Skinner, H. O.	St. Paul
Pugliese, Frank M.	Rochester	Ryan, John J.	St. Paul	Slater, S. A.	Worthington
		Ryan, Mark E.	St. Paul	Slocumb, J. A.	Plainview
		Ryan, W. J.	Duluth	Slocumb, Maude S.	Minneapolis
		Rygh, E. A.	Minneapolis	Slyfield, F. F.	Duluth
				Smallwood, J. T.	Worthington
Quale, Victor S.	Rochester	St. Clair, G. C.	Duluth	Smersh, F. M.	Owatonna
Quigley, T. C.	Owatonna	Sadler, William P.	Minneapolis	Smersh, J. F.	Owatonna
Quincy, Thomas F.	Minneapolis	Saffert, Cornelius A.	New Ulm	Smith, A. M.	Minneapolis
Quist, H. W.	Minneapolis	Sager, William W.	Rochester	Smith, Arthur E.	Minneapolis
		Sahr, W. G.	Hutchinson	Smith, B. A.	Crosby
Radquist, C. S.	Hibbing	Sanderson, A. G.	Granite Falls	Smith, B. F.	Willmar
Radabaugh, R. C.	Hastings	Sanderson, E. T.	Minneapolis	Smith, C. M.	Duluth
Radtke, H. P.	Rochester	Sanford, A. H.	Rochester	Smith, E. H.	Bemidji
Raihala, John	Virginia	Satersmoen, Theo.	Pelican Rapids	Smith, E. K.	Duluth
Rains, J. M.	Willmar	Sather, Allen	Fosston	Smith, F. D.	Kasson
Raiter, Franklin W. S.	Cloquet	Satterlund, Victor	St. Paul	Smith, F. L.	Rochester
Raiter, Roy F.	Cloquet	Savage, F. J.	St. Paul	Smith, Harry L.	Rochester
Ramsey, W. R.	St. Paul	Sawatzky, Wm. A.	Minneapolis	Smith, Homer R.	Minneapolis
Randall, Lawrence M.	Rochester	Sawyer, H. P.	Goodhue	Smith, L. G.	Montevideo
Rankin, F. W.	Rochester	Schaa, F. H. K.	Minneapolis	Smith, Leonard M.	Rochester
Ratcliffe, J. J.	Aitkin	Schaefer, S.	Winona	Smith, M. W.	Red Wing
Rathbun, A. M.	Rice	Schatz, F. J.	St. Cloud	Smith, Newton D.	Rochester
Rathbun, C. A.	St. Cloud	Scheldrup, N. H.	Minneapolis	Smith, Norman M.	Minneapolis
Rebman, E. C.	Austin	Scherer, C. E.	Duluth	Smith, P. A.	Faribault
Reed, Chas. A.	Minneapolis	Schild, E. L.	Mankato	Smith, William M.	Rochester
Rees, S. P.	Minneapolis	Schleselman, J. T.	Mankato	Snell, Albert M.	Rochester
Reeves, C. E.	Eagle Bend	Schlutz, Frederic W.	Minneapolis	Snyder, G. W.	St. Paul
Regnier, E. A.	Minneapolis	Schmidt, P. A.	Good Thunder	Soderling, A.	Minneapolis
Reineke, George F.	New Ulm	Schmidt, W. R.	Glencoe	Sorge, L.	Windom
Reiter, H. W.	Shakopee	Schmitt, A. F.	Minneapolis	Sohlberg, Olof	St. Paul
Rentschler, Calvin B.	Rochester	Schmitt, Earl O. G.	Rochester	Solmer, A. E.	Mankato
Rentschler, Edwin B.	Rochester	Schmitt, G. E.	Minneapolis	Solhaug, S. B.	Minneapolis
Repogle, W. H.	Wabasha	Schnarrenberger, G.	Winona	Somerfield, H. A.	Minneapolis
Reynolds, Hugh	Hibbing	Schneider, H. A.	Jordan	Souster, B. B.	St. Paul
Reynolds, J. S.	Minneapolis	Schneider, J. P.	Minneapolis	Spicer, F. W.	Duluth
Rice, Carl O.	Minneapolis	Schoch, J. L.	New Ulm	Sprafka, J. M.	St. Paul
Richards, E. T. F.	St. Paul	Schoch, R. B.	St. Paul	Spratt, C. N.	Minneapolis
Richards, W. B.	St. Cloud	Scholpp, O. W.	Hutchinson	Squire, Fay H.	Rochester
Richardson, Fred S.	Belgrade	Schons, E.	St. Paul	Stacy, L. J.	Rochester
Richardson, Harold E.	St. Paul	Schroder, C. H.	Duluth	Stangel, Fred	St. Cloud
Richardson, W. J.	Fairmont	Schultz, F. C.	St. Paul	Stangel, P. E.	St. Cloud
Richdori, L. F.	Minneapolis	Schultz, Irwin	Rochester	Stanley, C. R.	Worthington
Ridgway, A. M.	Annandale	Schulze, Albert G.	St. Paul	Stark, W. B.	Rochester
Ridgway, Florence	Minneapolis	Schussler, Otto F.	Minneapolis	Steffens, L. A.	Red Wing
Ridgway, Alexander	Belgrade	Schutz, Elmer S.	Mountain Lake	Steiner, I. W.	Winona
Rieniets, John H.	Rochester	Schwartz, Virgil J.	Minneapolis	Stemsrud, A. A.	Dawson
Riggs, C. E.	St. Paul	Schwyzner, Arnold	St. Paul	Stephan, E. L.	Hinckley
Rigler, Leo G.	Minneapolis	Schwyzner, Gustav	Minneapolis	Stephens, Brooks P.	Rochester
Rishmiller, J. H.	Minneapolis	Schwyzner, R.	Minneapolis	Sterner, E. G.	St. Paul
Risser, E. D.	Winona	Scotfield, C. L.	Benson	Sterner, O. W.	St. Paul
Ritchie, H. P.	St. Paul	Scott, F. H.	Minneapolis	Steven, Geo.	Bryon
Rivers, A. B.	Rochester	Scott, R. A.	Detroit Lakes	Stevens, F. A.	Lake Elmo
Rizer, R. I.	Minneapolis	Seashore, D. E.	Duluth	Stewart, A. B.	Owatonna
Roadman, I. M.	Ponsford	Seashore, Gilbert	Minneapolis	Stewart, Alexander	St. Paul
Roan, Carl M.	Minneapolis	Seham, Max	Minneapolis	Stewart, C. A.	Minneapolis
Robb, Edwin F.	Minneapolis	Seifert, Otto J.	New Ulm	Stewart, R. L.	Lindstrom
Robbins, C. P.	Winona	Selleseth, Iver	Minneapolis	Sterle, Adolph, Jr.	St. Paul
Roberts, L. M.	Little Falls	Senkler, G. E.	St. Paul	Stillwell, W. C.	Mankato
Roberts, Thos. S.	Minneapolis	Senn, E. W.	Owatonna	Stinnette, S. E.	St. Paul
Roberts, W. B.	Minneapolis	Sessions, John	Minneapolis	Stocking, Fred F.	Milaca
Robertson, A. W.	Rochester	Setzer, G. W.	Helena, Montana	Stolpestad, H. L.	St. Paul
Robertson, H. E.	Rochester	Setzer, H. J.	St. Paul	Stomel, Joseph	Minneapolis
Robertson, J. B.	Cottonwood	Shafter, Royce R.	Rochester	Strachauer, A. C.	Minneapolis
Robertson, W. P.	Litchfield	Shaleen, A. W.	Hallock	Strader, E. L.	Deerwood
Robilliard, C. M.	Faribault	Shannon, S. S.	Crosby	Strathern, F. P.	St. Peter
Robilliard, W. H.	Faribault	Shannon, W. Roy	St. Paul	Strathern, M. L.	Gilbert
Robinson, J. M.	Duluth	Shapiro, Morse J.	Minneapolis	Stratte, A. K.	Pine City
Robitshek, E. C.	Minneapolis	Shapiro, E. Z.	Duluth	Stratte, Harold C.	Pine City
Rochford, W. E.	Minneapolis			Stratte, J. J.	Hallock
Rodda, F. C.	Minneapolis				
Rodgers, C. L.	Minneapolis				

†Application for Emeritus or Honorary membership not completed.

Strickler, Mary.....Sleepy Eye
 Strobel, W. G.....Duluth
 Strout, E. S.....Minneapolis
 Strout, G. Elmer.....Minneapolis
 Stuart, A. B.....Cloquet
 Stuhler, Louis G.....Rochester
 Stuhr, J. W.....Stillwater
 Sturre, J. R.....Minneapolis
 Sukeforth, L. A.....Duluth
 Sundt, M.....Minneapolis
 Sutherland, C. G.....Rochester
 Sutherland, H. N.....Ely
 Sutton, Chas. S.....St. Cloud
 Sutton, L. F.....Mazeppa
 Swanson, Edwin O.....St. Paul
 Swanson, John A.....St. Paul
 Swanson, Roy E.....Minneapolis
 Swartwood, F. A.....Waseca
 Swedenburg, A. W.....Thief River Falls
 Sweeney, Arthur.....St. Paul
 Sweetser, H. B., Sr.....Minneapolis
 Sweetser, H. B., Jr.....Minneapolis
 Sweetser, Theodore.....Minneapolis
 Sweetzer, S. E.....Minneapolis
 Swendsen, J. I.....St. Paul
 Swennes, O. S.....Wahkon
 Swenson, Arnold O.....Duluth
 Swenson, Charles.....Braham
 Swenson, O. J.....Waseca
 Swenson, Paul C.....Duluth
 Swezey, B. F.....Buffalo
 Sybilrud, H. W.....Briceyn
 Synhorst, Alfred P.....Rochester

Taft, John O.....Minneapolis
 Tangen, Geo. M.....Canby
 Tanner, A. C.....Minneapolis
 Tanquist, E. J.....Alexandria
 Taylor, C. W.....Duluth
 Taylor, H. L.....St. Paul
 Taylor, Rood.....Minneapolis
 Taylor, Wm. J.....Pipestone
 Teisberg, C. B.....St. Paul
 Tennyson, Theo.....Minneapolis
 Ternstrom, O. H.....Minneapolis
 Thabes, J. A.....Brainerd
 Thabes, John A., Jr.....Brainerd
 Thomas, Geo. E.....Minneapolis
 Thomas, Geo. H.....Minneapolis
 Thomas, Gilbert I.....Minneapolis
 Thomas, Lester C.....Rochester
 Thompson, Albert.....St. James
 Thompson, Arthur.....Raymond
 Thompson, Gershom J.....Rochester
 Thompson, H. L.....Rochester
 Thompson, V. C.....Marine
 Thordarson, Theo.....Minneota
 Thoresen, Thor.....Oslo, Norway
 Thornby, H. J.....Moorhead
 Thorson, E. O.....Luverne
 Thysell, F. A.....Moorhead
 Tibbetts, M. H.....Duluth
 Tiber, L. J.....St. Paul
 Tiedemann, Elmer J.....Adrian
 Tierney, C. M.....Granger
 Tildersquist, D. L.....Duluth
 Tingdale, A. C.....Minneapolis
 Inkess, Donald E.....Rochester
 Toft, Josephine.....Dawson
 Torkelson, P. T.....Lyle
 Townsend, DeWayne.....Brooklyn
 Trøeger, C. A.....Faribault
 Tregilgas, H. R.....South St. Paul
 Trutna, Thos. J.....Silver Lake
 Tunstead, Hugh J.....Minneapolis
 Tuohy, E. L.....Duluth
 Turnaciff, D. D.....Minneapolis
 Turnbull, Robert.....Fossten

Tweedy, G. J.....Winona
 Tyrrell, C. C.....Minneapolis

Ude, Walter H.....Minneapolis
 Ulrich, Henry L.....Minneapolis
 Undine, Clyde A.....Minneapolis
 Urberg, S. E.....Duluth

Vadheim, A. L.....Tyler
 Vail, James B.....Henning
 Valentine, W. H.....Tracy
 Van Slyke, Chas. A.....St. Paul
 Van Valkenburg, B. F.....Long Prairie
 Van Valkenburg, F. W.....Long Prairie
 Vercellini, C. E.....Duluth
 Vickery, Eugene B.....Rochester
 Vicelli, James D.....Rochester
 Vik, Melvin.....Onamia
 Vinson, P. P.....Rochester
 Vistauet, P. S.....Shelly
 Vogel, Joseph.....New Ulm
 Vogtel, Melvin A.....Minneapolis
 Vollum, E. O.....Albert Lea
 Von Berg, J. P.....Albert Lea
 Von der Weyer, Wm.....St. Paul
 Von Lackum, W. H.....Rochester
 Vories, Ruth E.....Rochester
 Voyer, Emile O.....Minneapolis
 Vrooman, F. E.....St. Francis

Waas, Charles W.....St. Paul
 Wagener, H. P.....Rochester
 Wahlquist, Harold F.....Minneapolis
 Waldron, Carl W.....Minneapolis
 Walker, A. E.....Duluth
 Walker, G. H.....Winona
 Walker, R. E.....St. Paul
 Waller, Joseph D.....Wilmont
 Wallinga, John H.....St. Paul
 Walters, H. W.....Rochester
 Wanous, E. Z.....Minneapolis
 Ward, A. W.....Minneapolis
 Ward, Percy A.....Minneapolis
 Warham, T. T.....Minneapolis
 Warnock, R. W.....St. Paul
 Warren, C. L.....Brewster
 Warren, E. L.....St. Paul
 Warren, F. S.....Faribault
 Warwick, Margaret.....St. Paul
 Watson, A. M.....Royalton
 Watson, F. G.....Worthington
 Watson, J. A.....Minneapolis
 Watson, John D.....Holdingford
 Watson, N. M.....Red Lake Falls
 Wattam, G. S.....Warren
 Webb, R. C.....Minneapolis
 Webber, Edward E.....Duluth
 Webber, Fred L.....St. Paul
 Weber, H. M.....Rochester
 Weber, M. E.....Duluth
 Webster, H. E.....Duluth
 Weir, J. D.....Beardsley
 Weir, J. F.....Rochester
 Weirick, Howard R.....Hibbing
 Weiser, Geo. B.....New Ulm
 Weisman, S. A.....Minneapolis
 Weissgerber, L. A.....Brownton
 Welch, M. C.....St. Paul
 Wellbrock, William L.....Rochester
 Wellcome, J. W. B.....Sleepy Eye
 Welles, H. J.....Minneapolis
 Wenner, W. T.....St. Cloud
 Wentworth, A. J.....Mankato
 Werner, O. S.....St. Paul
 Westby, Nels.....Madison
 Westerman, A. F.....Montgomery
 Westerman, F. C.....Montgomery
 Wethall, A. G.....Minneapolis

Wetherby, Macnider.....Minneapolis
 Weum, T. Wm.....Minneapolis
 Wheeler, D. W.....Duluth
 Wheeler, M. W.....St. Paul
 Wheeler, Theodora.....Rochester
 Whetstone, Mary S.†.....Minneapolis
 Whitacre, J. C.....St. Paul
 Whitcomb, Ed. H.....St. Paul
 White, J. S.....St. Paul
 White, Robert B.....Rochester
 White, S. Marx.....Minneapolis
 Whitmore, F. W.....St. Paul
 Whitney, A. W.....St. Paul
 Whitten, Merritt B.....Rochester
 Wickham, Mont. C.....Rochester
 Widen, W. F.....Minneapolis
 Wiese, H. F. B.....Minneapolis
 Wilcox, Arch E.....Minneapolis
 Wilcox, F. L.....Walker
 Wilder, Robert L.....Minneapolis
 Wilder, R. M.....Rochester
 Wilhelmj, Charles M.....Rochester
 Williamson, George A.....St. Paul
 Wilkinon, Stella.....Duluth
 Will, W. W.....Bertha
 Willcutt, Clarence.....Minneapolis
 Williams, Clayton.....St. Paul
 Williams, Henry L., Jr.....Rochester
 Williams, H. L.....Minneapolis
 Williams, Leon A.....Slayton
 Williams, Robert.....Minneapolis
 Williams, R. J.....Pine River
 Williams, R. V.....Rushford
 Williams, Thomas B.....Rochester
 Willis, F. A.....Rochester
 Wilmot, H. E.....Litchfield
 Wilson, L. B.....Rochester
 Wilson, R. H.....Harmony
 Wilson, Warren.....Northfield
 Wilson, W. E.....Northfield
 Wilson, W. F.....Lake City
 Wiltout, I. Geo.....Oslo
 Winnick, J. B.....St. Paul
 Winter, J. A.....Duluth
 Witham, C. A.....Minneapolis
 Wittich, F. W.....Minneapolis
 Wohlrabe, A. A.....Minneapolis
 Wohlrabe, Clarence F.....Springfield
 Wohlrabe, E. J.....Springfield
 Wold, K. C.....St. Paul
 Wolfe, H. H.....St. Paul
 Woltman, H. W.....Rochester
 Wood, Douglas F.....Minneapolis
 Wood, H. G.....Rochester
 Woodruff, C. W.....Chatfield
 Woodworth, Elizabeth.....Minneapolis
 Workman, H. M.....Tracy
 Workman, W. G.....Tracy
 Wray, W. F.....Campbell
 Wright, C. B.....Minneapolis
 Wright, Charles D'a.....Minneapolis
 Wright, C. O.....Luverne
 Wright, Franklin R.....Minneapolis
 Wynne, H. M. N.....Minneapolis

Yater, Wallace M.....Rochester
 Ylvisaker, L. S.....St. Paul
 Yoerg, O. W.....Minneapolis
 Young, T. O.....Duluth
 Young, V. A.....Duluth

Zander, C. H.....St. Paul
 Zaworske, E. A.....Minneapolis
 Ziegler, Lloyd A.....Rochester
 Zierold, A. A.....Minneapolis
 Zimmermann, H. B.....St. Paul
 Zlatovski, Michael.....Duluth

†Application for Emeritus or Honorary membership not completed.